

Industry PC barebone for an NVIDIA® Jetson™ TX2 8G module

The Shuttle EN01B serves as a basis for an optional NVIDIA® Jetson™ TX2 8G module to equip this with a rugged metal chassis and various connectors. Both components together make it a 450 ml super computer as a result which is intended for DIN-Rail or VESA mounting. It is designed for maintenance-free 24/7 operation at ambient temperatures of up to 50 °C. Such a system is targeted at professional applications like high-performance edge computing, simulation of neural networks, robot control, machine vision with cameras etc.

The NVIDIA® Jetson™ TX2 8G is a power-efficient super computer-on-a-module with a 256-core NVIDIA Pascal™-family graphics processor and brings true AI computing power for edge computing under Linux. It comes with 4 or 8 GB RAM, 32 GB eMMC memory. The CPU module and also the appropriate heatsink with fan must be purchased separately.

Feature Highlights

Industry Design	<ul style="list-style-type: none"> Robust aluminium chassis, black, IP20 Size: 92.4 x 54.4 x 90 mm (LWH) = 450 ml Operating temperature: 0~50 °C VESA mount and DIN Rail Support Always-on function (no Power-on button)
Operating System	<ul style="list-style-type: none"> An operating system is not included. Supports Linux (64-bit)
CPU Board (not included)	<ul style="list-style-type: none"> Compatible to the NVIDIA® Jetson™ TX2 8G computer module. This module and the heatsink is not included with Shuttle EN01B.
Connectors	<ul style="list-style-type: none"> Power-on LED indicator, Reset Button HDMI 1.4b video output 2x USB 3.2 Gen 1 Type A (max. 5 Mbps) Micro USB 2.0, RJ45 Gigabit LAN (RTL8119I-CG) Micro SD card reader Hole for Kensington Lock
Other	<ul style="list-style-type: none"> M.2 B-key slot supports M.2-2242 SSD card, video capture card or M.2-3042 LTE module Slot for nano SIM card Hardware monitor, watch dog, fTPM 2.0 Onboard connector for power/reset button, 2x RS232 (RS422/485), 4x GPIO, I2C bus, CAN bus
Optional Features	<ul style="list-style-type: none"> Second Gigabit LAN port with Power over Ethernet function (PoE with PD or PSE support) LTE/4G or WLAN function with 2 antennas HDMI input with video capture function External Power Adapter
DC input	<ul style="list-style-type: none"> 12~19V DC-input by 2-pin Euroblock Including adapter for 5.5 / 2.5 mm DC plug Power adapter is not included Optional Power over Ethernet (PoE)
Certification	<ul style="list-style-type: none"> Safety: CB, BSMI, ETL, IP20 EMI: FCC, CE, BSMI, VCCI, RCM

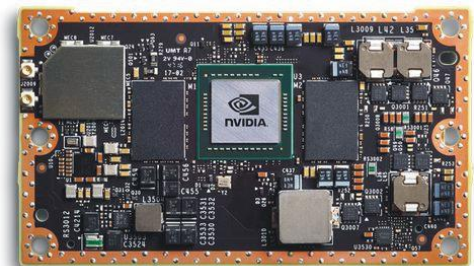
Shuttle Edge EN01B

Industry PC Barebone

NVIDIA® Jetson™ TX2



Shuttle EN01B



NVIDIA Jetson Module

Images for illustration only.
The Shuttle EN01B does not include the NVIDIA® Jetson™ TX2 module and the appropriate heatsink with cooling fan.

Models of the EN01 series:

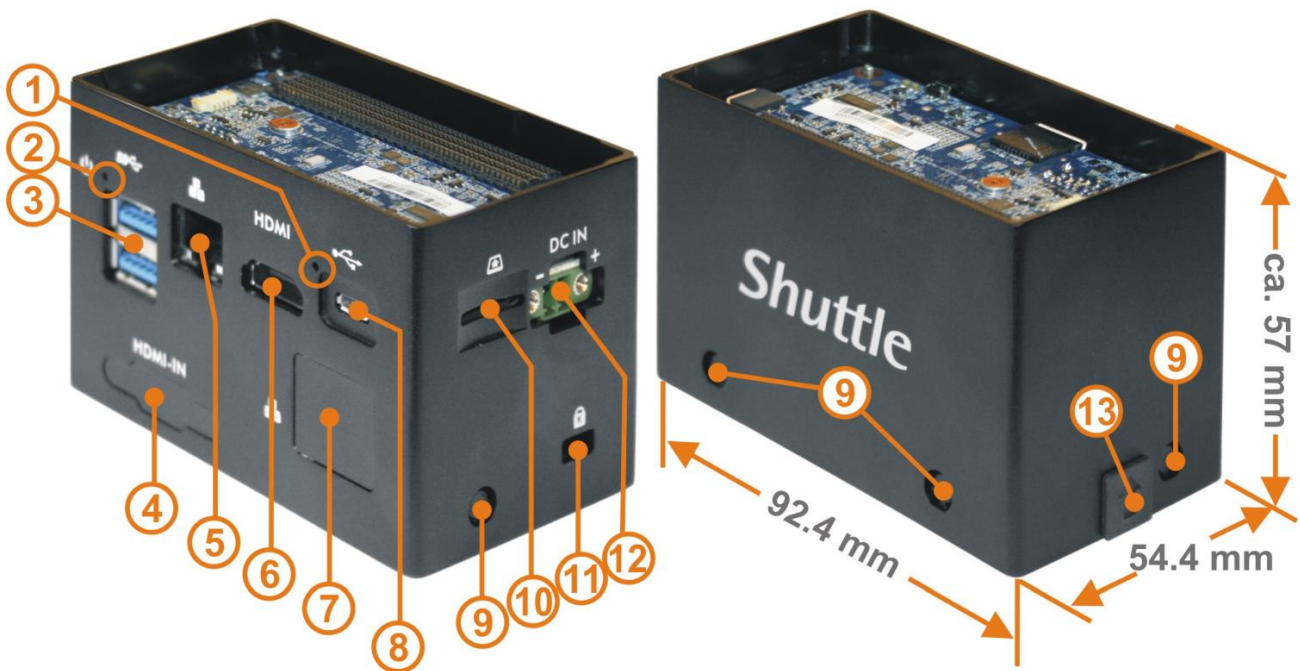
Name	Processor	RAM/eMMC	Temp.
EN01J3	Celeron J3355	4 / 64 GB	0~50 °C
EN01J4	Pentium J4205	8 / 64 GB	0~50 °C
EN01E	Atom x5-E3940	8 / 64 GB	-20~65 °C
EN01B	(1)	(1)	0~50 °C

(1) The EN01B is intended as a basis for the NVIDIA Jetson TX2 8G module which also contains the heatsink.



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Shuttle Edge EN01B – Outside View



- 1** Reset Button
- 2** Power LED
- 3** 2x USB 3.2 Gen 1 (max. 5 Gbps)
- 4** HDMI input (optional)
- 5** RJ45 LAN port
- 6** HDMI 1.4b output
- 7** RJ45 LAN port with PoE (optional)

- 8** Micro USB 2.0
- 9** 4x 6.5 mm hole for external antennas
- 10** Micro SD card reader
- 11** Hole for Kensington Lock
- 12** DC input Euroblock connector
- 13** Pilot hole for wire



Adapter Cable

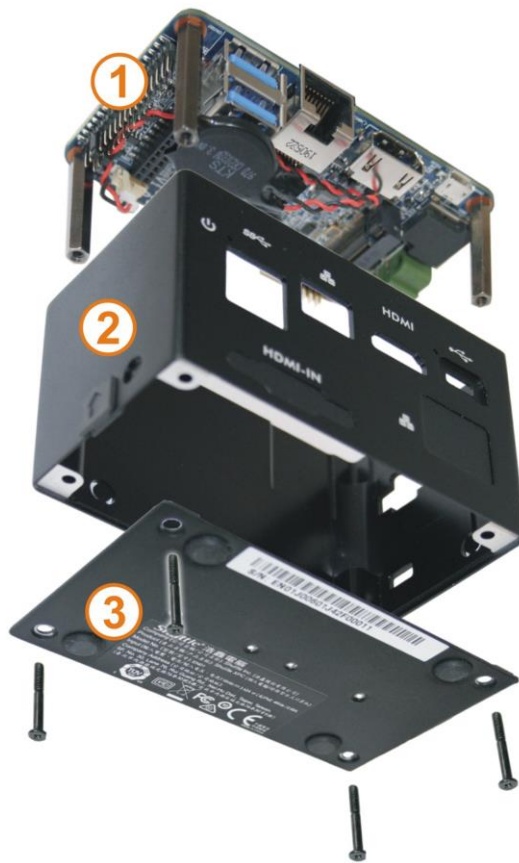
DC-Input Connector

The EN01B supports 12~19V DC input voltage. The 2-pin Euroblock with Phoenix connector enables a DC cable to be connected via terminal strip.

In addition, the included **adapter cable** allows a power adapter with 5.5 / 2.5 mm DC plug to be connected.

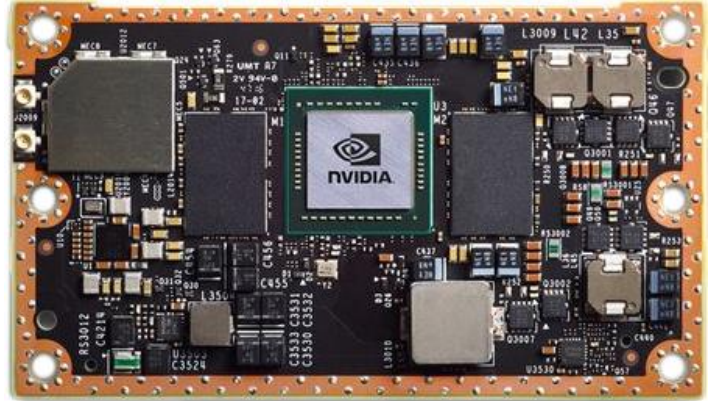
Shuttle Edge EN01B – Inside View

The EN01B consists of a robust aluminium chassis with a **Carrier Board**. It serves as a basis for an optional **NVIDIA® Jetson™ TX2 8G module** which must be purchased separately. A power adapter is not included.

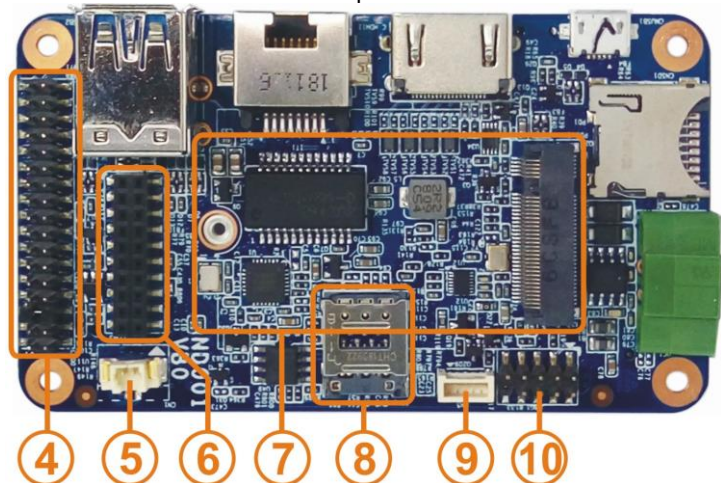


- 1 Carrier Board
- 2 Chassis (aluminium)
- 3 Bottom element (steel)

NVIDIA® Jetson™ TX2 8G module (not included) with a 256-core GPU, 4 or 8 GB RAM and 64 GB eMMC flash memory.



Carrier Board with several I/O ports and M.2 / Nano-SIM slots.

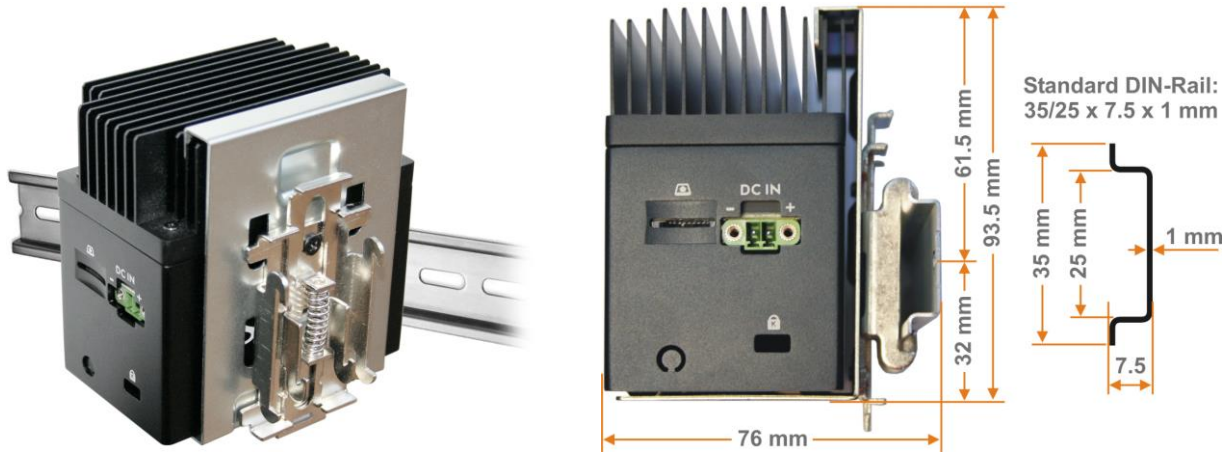


- 4 Expansion I/O header J4 (34-pin)
- 5 Connector for CMOS battery
- 6 Connector for optional PoE extension
- 7 M.2-3042 B-key slot
It supports one of the below components:
 - 1) M.2 SSD card
 - 2) HDMI capture card
 - 3) LTE/4G module
- 8 Slot for nano SIM card
- 9 No function (reserved)
- 10 CanBus connector

Shuttle Edge EN01B – Mounting Options

1) DIN-rail mounting

The EN01B comes with a bracket and a DIN-rail clip to be easily installed on a standard DIN-rail.



Images for illustration only.

2) VESA mounting

The EN01B comes with a bracket and a VESA mount to install it to any monitor, arm or wall mount which complies with the 75x75 or 100x100 mm VESA standard.



3) On a desk

The EN01B comes with rubber feet on the bottom side and can also be placed on a desk.



Three ways to supply power to the EN01B



Images for illustration only.

1) DIN Rail PSU

The EN01B supports 12~19V DC input voltage. The 2-pin Euroblock with Phoenix connector enables a DC cable to be connected to a DIN rail power supply.

The recommended minimum output wattage of the power adapter is:

- 40 W, if the accessory PSE01 is not used.
- 65 W, if the accessory PSE01 is installed.



2) Power Adapter

In addition, the included adapter cable allows a power adapter with a 5.5 / 2.5 mm DC plug to be connected, such as the **Shuttle accessory PE90**.



3) Power-over-Ethernet (PoE)

The optional **Shuttle accessory PD01** is a daughterboard which provides a second Gigabit network port with PoE function. This enables the EN01B to receive power over the same network cable that transports data, and so does away with the need for a nearby power outlet. The power comes from a PoE-enabled Ethernet switch or from a power injector (48V, 0.65A) at the other end of the network cable.

Shuttle Edge EN01B – Optional Accessories

Second LAN port with PoE function

The optional Shuttle accessory **PD01** and **PSE01** are daughter-boards which provide a second Gigabit network port with PoE function. PoE (Power-over-Ethernet) enables network devices to receive power over the same network cable that transports data.

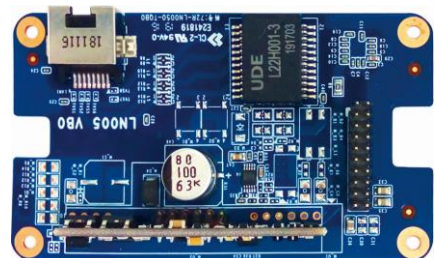
Shuttle accessory **PD01**

Adding PD01 allows the EN01B to be powered over the LAN cable and thus it becomes a Powered Device (PD).



Shuttle accessory **PSE01**

The PSE01 makes the EN01B act as Power Sourcing Equipment (PSE) that carries both data and operating voltage to a connected network device, such as an IP camera.



Note: the Shuttle accessories listed below cannot be combined:

Two LTE/4G antennas: Shuttle accessory **WWN01**

The EN01B can be enhanced to support mobile internet with the following hardware components:

- 1) an LTE/4G module in M.2-3042 format
- 2) an activated Nano SIM card
- 3) the Shuttle accessory WWN01 with two LTE/4G antennas and cables

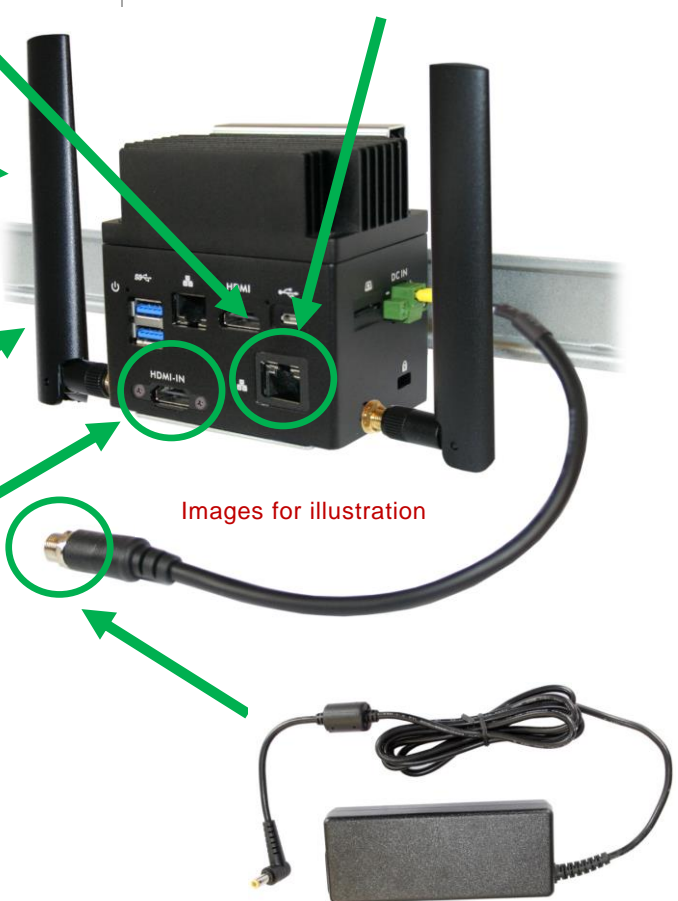
WLAN expansion kit: Shuttle accessory **LN007** and **WLN-M**

WLAN-ac and BT 4.0 function is supported by the M.2 adapter card **LN007** and the WLAN kit **WLN-M**.



HDMI capture card: Shuttle accessory **MCAP01**

The MCAP01 consists of a HDMI Capture Card in M.2 format and includes an adapter cable for an additional HDMI-in port. Using this accessory, HDMI video signals can be recorded and processed from an external source.



Images for illustration

Power Adapter (90 W / 19V): Shuttle accessory **PE90**

The EN01B comes with an adapter cable with a 5.5 / 2.5 mm DC plug which is compatible with power adapters such as the PE90.

Shuttle Edge EN01B - Specifications

24/7 Nonstop Operation	This device is approved for 24/7 permanent operation. Requirement: Free air circulation around the PC must be guaranteed. This device comes without a power-on button. The boot process starts as soon as power is applied. [1]
Chassis	Black chassis made of aluminium and steel Dimensions: 92.4 x 54.4 x 90 mm (LWH) = 450 ml Height without NVIDIA Jetson TX2 8G module: ca. 57 mm (Height including rubber feet) Weight: 0.48 kg net and 1.03 kg gross With hole for Kensington Lock IP protection rating: IP20
Operating Positions	1) Mounted on a DIN-Rail (e.g. inside equipment racks) 2) Vertical (e.g. VESA-mounted behind an appropriate monitor) 3) Standing on its rubber feet as a desktop PC
Operating System	This system comes without operating system. It is compatible with Linux (64-bit)
CPU module & heat sink	EN01B is compatible with the NVIDIA® Jetson™ TX2 8G CPU module. The CPU module and also the appropriate heatsink with fan must be purchased separately.
M.2 expansion slot	The M.2-3042 B-key expansion slot provides the following interfaces: 1) PCI-Express Gen. 2.0 X1 2) SATA v3.0 (max. 6 Gbps) 3) USB 3.2 GEN 1 The following components can be used in this slot: 1) optional HDMI capture card MCAP01 [3] or 2) optional LTE/4G module [4] or 3) optional WLAN module [5] or 4) M.2-2242 SSDs with SATA- or PCIe/NVMe interface (B+M key required, only M key is not compatible) <u>Note:</u> Please go to the "Advanced" tab in the BIOS setup and set "M.2 Device Select" to "PCIe" or "SATA" according to the type of M.2 card used.
SIM expansion slot	A nano SIM card can be installed in an appropriate slot directly on the mainboard. The SIM card can be used in combination with an optional LTE/4G module that is to be installed in the M.2-3042 slot [4].
Micro SD Card Reader	Integrated card reader Supports Micro SD, Micro SDHC and Micro SDXC memory flash cards Supports booting from SD card

<i>Wired Network</i>	<p>RJ45 connector supports Gigabit LAN at 10/100/1000 Mbit/s.</p> <p>Realtek RTL8119I-CG Ethernet Controller</p> <p>Supports Wake-on-LAN</p>
<i>Connectors and LED</i>	<ul style="list-style-type: none"> - Power LED [1] - Reset Button (Recovery) - HDMI 1.4b digital video and audio output - 2x USB 3.2 GEN 1 Type A - Micro USB 2.0 - Micro SD card reader - Gigabit network port (LAN, RJ45) - DC input (2-pin Euroblock) - 4x perforated 6.5 mm holes for optional LTE/4G antennas - Optional: second Gigabit network port [2] - Optional: HDMI input [3] - Hole for Kensington Lock
<i>Onboard I/O connector</i>	<p>5-pin connector: "CN5" CanBus</p> <p>34-pin header "J1" with I/O ports as follows:</p> <ul style="list-style-type: none"> - Power Button (pin 11) - Reset Button (pin 13) - Always-on function (pin 29-30 shortened by jumper) - RS232 3.3V (pin 2, 4, 6, 8) - RS232/422/485 3.3V (pin 31, 32, 33, 34) - 4x GPIO 1.8V (pin 21, 23, 25, 27) - I2C bus (pin 22, 24) - Recovery (Pin 15) <p><u>Reserved pins:</u></p> <ul style="list-style-type: none"> - UART 3.3V (Pin 1, 3, 5, 7): Debug Port
<i>DC Input connector</i>	<p>The 2-pin Euroblock connector supports 12~19V of DC input voltage.</p> <p>The included Phoenix connector enables a DC cable to be connected via terminal strip.</p> <p>In addition, the included adapter cable allows a power adapter with a 5.5 / 2.5 mm DC plug to be connected.</p> <p>The recommended minimum output wattage of the power adapter is:</p> <ul style="list-style-type: none"> - 40 W, if the accessory PSE01 is not used. - 65 W, if the accessory PSE01 is installed.
<i>Power Supply via PoE (opt.)</i>	<p>The PC is powered either via the DC input connector or via PoE (Power over Ethernet). The PoE function can be added with the optional Shuttle accessory PD01 [2].</p> <p>The Power Sourcing Equipment (PSE, e.g. PoE switch or injector) should be capable to deliver at least 48V DC / 0.65A.</p>

Supplied Accessories	<ul style="list-style-type: none"> - Multi-language user guide (EN, DE, FR, ES, JP, KR, SC, TC) - Bracket for VESA and DIN-Rail mounting - Two screws M3 x 4 mm (attaches mounting bracket to PC) - DIN-Rail clip - Two screws M3 x 4 mm (attaches mounting bracket to DIN-Rail clip) - VESA mount for 75 / 100 mm standard - Four screws M4 x 10 mm (to affix VESA mount on PC) - Two screws M3 x 5 mm (to mount an M.2 card) - 2-pin Phoenix connector - DC adapter cable (connects the Phoenix connector to a 2.5 / 5.5 mm coaxial DC plug of a power adapter) <p><u>Note:</u> A power adapter is not included.</p>
Optional Accessories	<ul style="list-style-type: none"> • PD01: PD daughterboard to power EN01B by PoE (48V, 0.65A) [2] • PSE01: PSE daughterboard - EN01B acts as a PoE power source (48V, 0.5A) [2] • MCAP01: HDMI capture card in M.2-2242 format with HDMI cable [3] • WWN01: Set with two LTE/4G antennas and antenna cables [4] • LN007 and WLN-M: WLAN kit with WLAN card, M.2 adapter and two antennas [5] • PE90: Power Adapter (19V / 90W)
Environmental Specifications	<p>Operating temperature range: 0 ~ 50 °C</p> <p>Relative humidity range: 10 ~ 90 % (non-condensing)</p> <p><u>Warning:</u> Never touch the heatsink during or just after operation, as it can get very hot during normal operation. Be sure to wait for the heatsink to cool off before touching it.</p>
Certification & Compliance	<p>EMI: FCC, CE, BSMI, VCCI, RCM</p> <p>Safety: ETL, CB, BSMI, IP20</p> <p>Other: RoHS, Energy Star, ErP</p> <p>This device is classed as a technical information equipment (ITE) in class B and is intended for use in living room and office. The CE-mark approves the conformity by the EU directives:</p> <p>(1) 2014/30/EU relating to electromagnetic compatibility (EMC),</p> <p>(2) 2014/35/EU relating to Electrical Equipment designed for use within certain voltage limits (LVD),</p> <p>(3) 2009/125/EC relating to eco design requirements for energy-related products (ErP),</p> <p>(4) 2014/53/EU Radio Equipment Directive (RED)</p>

Footnotes:

[1] Non-stop operation

The EN01B is intended for 24/7 non-stop operation. This device comes without a power-on button, and the boot process starts as soon as power is applied. It is still possible to switch off the system by shutting down the operating system into Soft-Off mode (S5). There are three ways to switch the system on again:

- Interruption of power supply
- Via Wake-on-LAN (WoL) by sending a Wake-Up signal to the LAN port
- By connecting an external power button (normally open) to the internal 34-pin header "J4" (please refer to the PDF version of the Quick Guide). The button has to be connected to pin 11 and 12, and the Always-On function has to be disabled by removing the jumper from pin 29/30.

[2] Second LAN port with PoE function (optional)

The optional Shuttle accessories PD01 and PSE01 are daughterboards which provide a second Gigabit network port with PoE function. PoE (Power-over-Ethernet) enables network devices to receive power over the same network

cable that transports data. Adding the **Shuttle accessory PD01** allows the EN01B to be powered over the LAN cable and thus it becomes a Powered Device (PD). The **Shuttle accessory PSE01** makes the EN01B act as Power Sourcing Equipment (PSE) that carries both data and operating voltage to a connected network device, such as an IP camera.

[3] HDMI Capture Card (MCAP01)

The optional Shuttle accessory MCAP01 consists of an HDMI Capture Card in M.2 format and includes an adapter cable for an additional HDMI-in port. Using this accessory, HDMI video signals can be recorded and processed from an external source.

[4] Optional LTE/4G function

The EN01B can optionally be enhanced to support mobile internet with the following hardware components:

- 1) an LTE/4G module in M.2-3042 format
- 2) an activated Nano SIM card
- 3) the Shuttle accessory WWN01 with two LTE/4G antennas and cables

[5] Optional WLAN function

Two accessory products are required to upgrade the PC with a WLAN function:

- 1) **WLN-M** is a WLAN kit consisting of a WLAN card in M.2-2230 format (supports WLAN-ac 2.4 / 5 GHz and BT 4.0), two external antennas and antenna cables
- 2) **LN007** is a M.2 adapter board (the M.2 slot of EN01 is B/M key, the WLAN card is A/E key)