

Robust Industry PC with VESA/DIN-Rail mount and various options

**Shuttle Edge
EN01E**

The Shuttle EN01E is a fanless IPC in a robust 450 ml metal chassis and intended for DIN-Rail or VESA mounting. It is flexible in use and designed for maintenance-free 24/7 operation at ambient temperatures of up to 65°C. Inside there is a CPU board with an Intel "Apollo Lake" processor and a carrierboard with several I/O ports and a card reader. Optional features comprise a second LAN port with PoE function, LTE/WLAN function and video capturing via HDMI. This product is targeted at professional applications such as edge computing (IoT gateway), automation, digital signage, control, data logging and video surveillance.

Intel Atom x5-E3940, 8 GB RAM, 64 GB eMMC



Images for illustration only. External LTE antennas, second LAN port and HDMI input are optional features.



Fanless



24/7 Support



Max. 50 °C



VESA & DINRAIL



WLAN / LTE Optional

Feature Highlights

Industry Design	<ul style="list-style-type: none"> • Robust aluminium chassis, black, IP20 • Fanless cooling design, virtually noiseless • Size: 92.4 x 54.4 x 90 mm (LWH) = 450 ml • Operating temperature: -20 ~ 65 °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 Windows 10 (64-bit) and Linux
CPU Board	<ul style="list-style-type: none"> • Intel "Apollo Lake" Processor, TDP: 9.5W Atom x5-E3940, 1.6~1.8 GHz, Quad Core • 8 GB LPDDR4-2400 RAM memory (soldered) • 64 GB eMMC flash memory
Connectors	<ul style="list-style-type: none"> • Power-on LED indicator • 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 and I2C 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

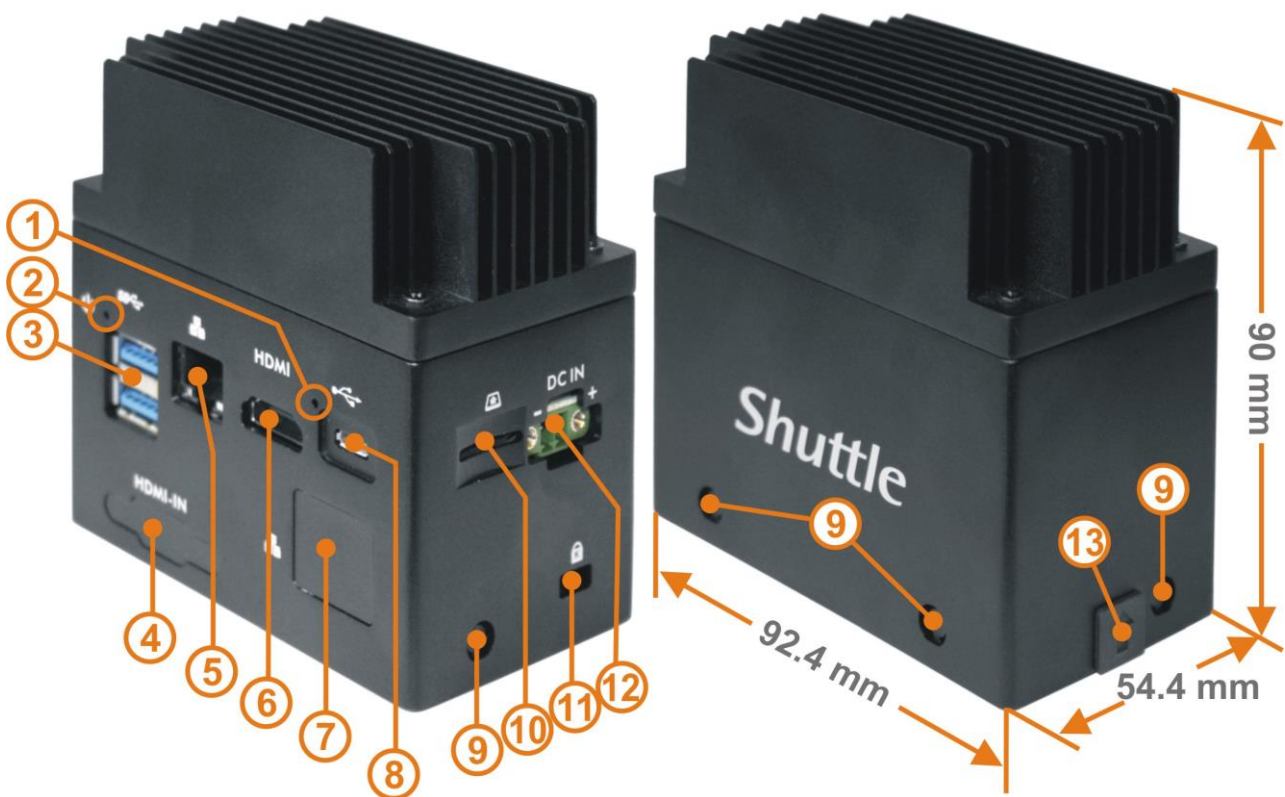
Models of the EN01 series:

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.



Shuttle Edge EN01E – Outside View



- | | |
|--|--|
| <ul style="list-style-type: none"> 1 No function (reserved) 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) | <ul style="list-style-type: none"> 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 |
|--|--|



DC-Input Connector

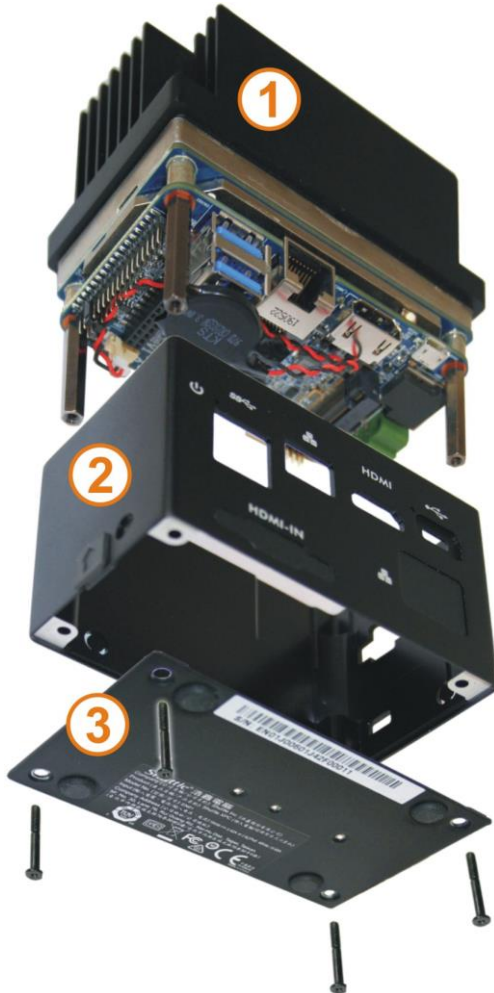
The EN01E supports 12~19V DC input voltage. The 2-pin Euroblock with Phoenix connector enables a DC cable to be connected via terminal strip.

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

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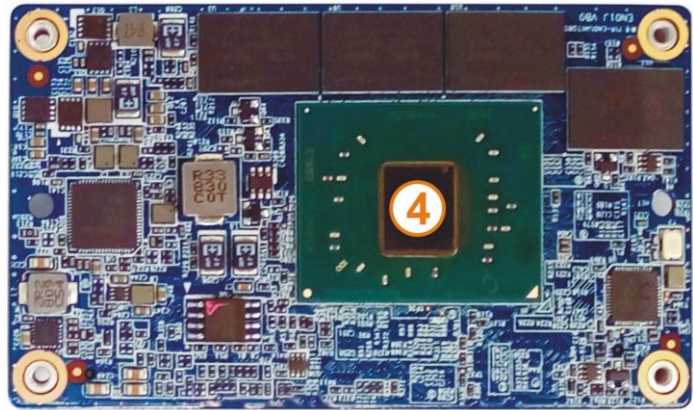
Shuttle Edge EN01E – Inside View

The EN01E consists of a robust aluminium chassis with a large heatsink. The standard version is a complete IPC that includes a **CPU Board** and a **Carrier Board**. A power adapter is not included.

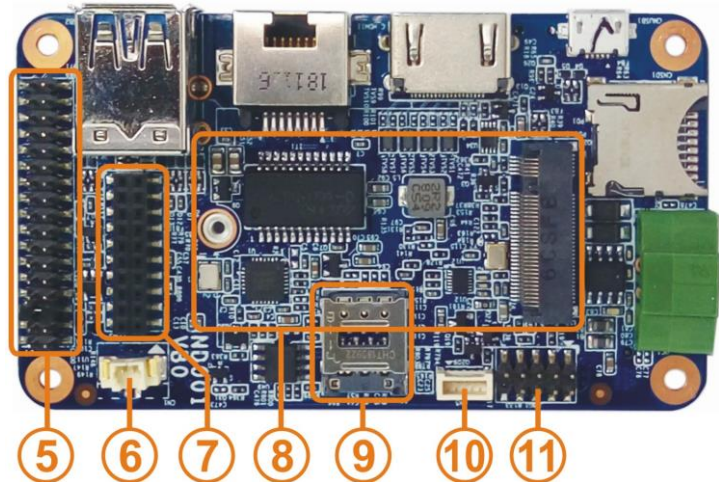


- 1** Heatsink (aluminium)
- 2** Chassis (aluminium)
- 3** Bottom element (steel)

CPU Board with Intel Atom x5-E3940 processor (Apollo Lake), 8 GB LPDDR4-2400 RAM and 64 GB eMMC flash memory.



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

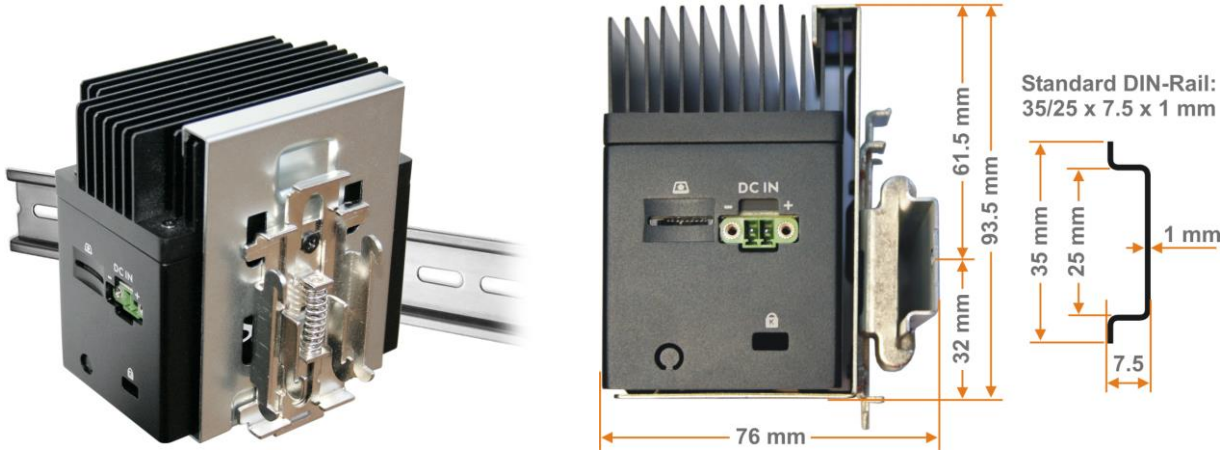


- 4** Intel processor (Atom x5-E3940)
- 5** Expansion I/O header J4 (34-pin)
- 6** Connector for CMOS battery
- 7** Connector for optional PoE extension
- 8** M.2-3042 B-key slot
It supports one of the below components:
1) M.2 SSD card
2) HDMI capture card
3) LTE/4G module
- 9** Slot for nano SIM card
- 10** No function (reserved)
- 11** Debug connector (reserved)

Shuttle Edge EN01E – Mounting Options

1) DIN-rail mounting

The EN01E comes with a bracket and a DIN-rail clip to be easily installed on a standard DIN-rail.



2) VESA mounting

The EN01E 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 EN01E comes with rubber feet on the bottom side and can also be placed on a desk.



Three ways to supply power to the EN01E



1) DIN Rail PSU

The EN01E 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 EN01E 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 EN01E – 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 EN01E to be powered over the LAN cable and thus it becomes a Powered Device (PD).



Shuttle accessory **PSE01**

The PSE01 makes the EN01E 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 EN01E 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

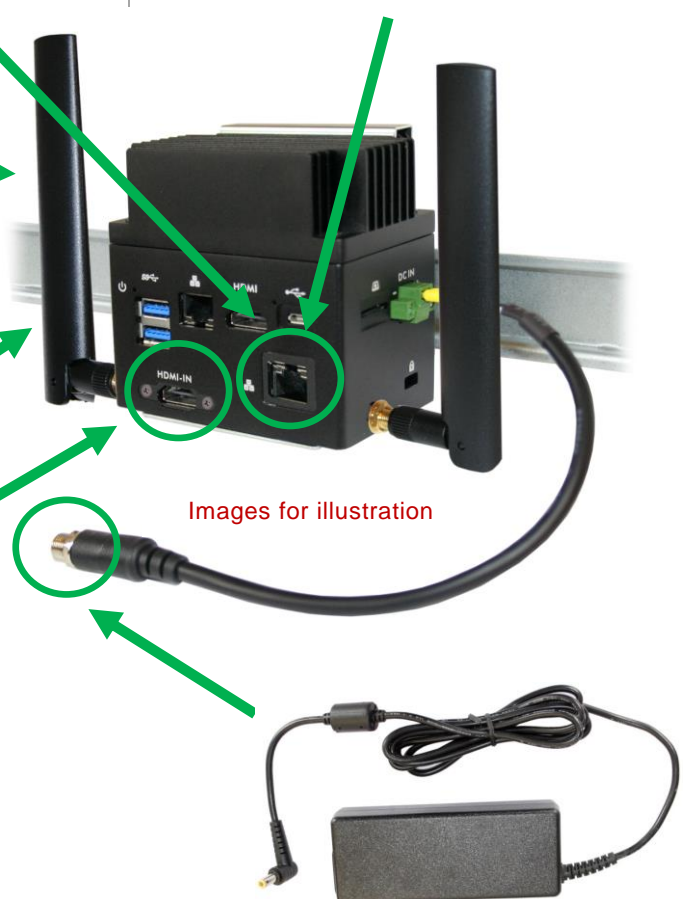
WLAN expansion kit: Shuttle accessory **LN007** and **WLN-M**

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 EN01E 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 EN01E - Specifications

<p><i>Fanless and silent</i></p>	<p>Completely fanless, virtually noiseless Large aluminium heatsink Passive cooling through convective heat transfer Ideal for noise-sensitive environments Fanless means less dust inside the case and thus virtually no maintenance required.</p>
<p><i>24/7 Nonstop Operation</i></p>	<p>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]</p>
<p><i>Chassis</i></p>	<p>Black chassis made of aluminium and steel Dimensions: 92.4 x 54.4 x 90 mm (LWH) = 450 ml (Height including rubber feet) Weight: 0.48 kg net and 1.03 kg gross With hole for Kensington Lock IP protection rating: IP20</p>
<p><i>Operating Positions</i></p>	<p>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</p>
<p><i>Operating System</i></p>	<p>This system comes without operating system. It is compatible with: - Windows 10 (64-bit) - Linux (64-bit)</p>
<p><i>Processor</i></p>	<p>Intel® Atom® processor x5-E3940, Quad Core CPU clock frequency: 1.6 GHz, max. Turbo frequency: 1.8 GHz Code name: "Apollo Lake" 14 nm structure, FCBGA1296 package (soldered) CPU cores / Threads: 4 / 4 L2 Cache: 2 MB Thermal Design Power (TDP): 9.5 W Supports x86-64, AES-NI, VT-x (EPT), VT-d System-on-Chip processor (SoC) with integrated graphics processor, no additional chipset required Fanless cooling system</p>
<p><i>Integrated Graphics</i></p>	<p>The Graphics Processing Unit (GPU) is integrated in the processor. Intel® HD Graphics 500 (Intel Gen 9), graphics frequency: 400~600 MHz Supports DirectX 12, Intel Quick Sync Video, Intel Clear Video (HD), Shared Memory Execution Units (EU): 12</p>

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<p><i>UEFI Firmware</i></p>	<p>16 MB Flash ROM with AMI UEFI BIOS Firmware Based on the Unified Extensible Firmware Interface (UEFI) Supports Wake-on-LAN (WOL) from S3, S4, S5 ACPI states Supports boot up from external flash memory cards (USB or SD card) Embedded Firmware TPM v2.0 (fTPM), can be activated in BIOS setup Supports Hardware Monitoring and Watch Dog functionality (fixed timer)</p>
<p><i>RAM Memory</i></p>	<p>8 GB LPDDR4 RAM memory (2400 MHz), soldered</p>
<p><i>Flash Memory</i></p>	<p>64 GB eMMC flash memory Expandable via Micro SD card</p>
<p><i>M.2 expansion slot</i></p>	<p>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.</p>
<p><i>SIM expansion slot</i></p>	<p>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].</p>
<p><i>Micro SD Card Reader</i></p>	<p>Integrated card reader Supports Micro SD, Micro SDHC and Micro SDXC memory flash cards Supports booting from SD card</p>
<p><i>Wired Network</i></p>	<p>RJ45 connector supports Gigabit LAN at 10/100/1000 Mbit/s. Realtek RTL8119I-CG Ethernet Controller Supports Wake-on-LAN</p>
<p><i>Connectors and LED</i></p>	<ul style="list-style-type: none"> - Power LED [1] - 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

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<p><i>Onboard I/O connector</i></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) <p><u>Reserved pins:</u></p> <ul style="list-style-type: none"> - UART 3.3V (Pin 1, 3, 5, 7): Debug Port - Recovery (Pin 15): no function <p><u>Note:</u> The onboard connector "CN5" (CanBus) cannot be used.</p>
<p><i>DC Input connector</i></p>	<p>The 2-pin Euroblock connector supports 12~19V of DC input voltage. The included Phoenix connector enables a DC cable to be connected via terminal strip. 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.
<p><i>Power Supply via PoE (opt.)</i></p>	<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>
<p><i>Supplied Accessories</i></p>	<ul style="list-style-type: none"> - Multi-language user guide (EN, DE, FR, ES, JP, KR, SC, TC) - Driver DVD (Windows 10, 64-bit) - 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>
<p><i>Optional Accessories</i></p>	<ul style="list-style-type: none"> • PD01: PD daughterboard to power EN01E by PoE (48V, 0.65A) [2] • PSE01: PSE daughterboard - EN01E 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)
<p><i>Environmental Specifications</i></p>	<p>Operating temperature range: -20 ~ 65 °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>

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**Certification
& Com-
pliance**

EMI: FCC, CE, BSMI, VCCI, RCM

Safety: ETL, CB, BSMI, IP20

Other: RoHS, Energy Star, ErP

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:

- (1) 2014/30/EU relating to electromagnetic compatibility (EMC),
- (2) 2014/35/EU relating to Electrical Equipment designed for use within certain voltage limits (LVD),
- (3) 2009/125/EC relating to eco design requirements for energy-related products (ErP),
- (4) 2014/53/EU Radio Equipment Directive (RED)

Footnotes:**[1] Non-stop operation**

The EN01E 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 EN01E to be powered over the LAN cable and thus it becomes a Powered Device (PD). The **Shuttle accessory PSE01** makes the EN01E 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 EN01E can optionally be enhanced to support mobile internet with the following hardware components:

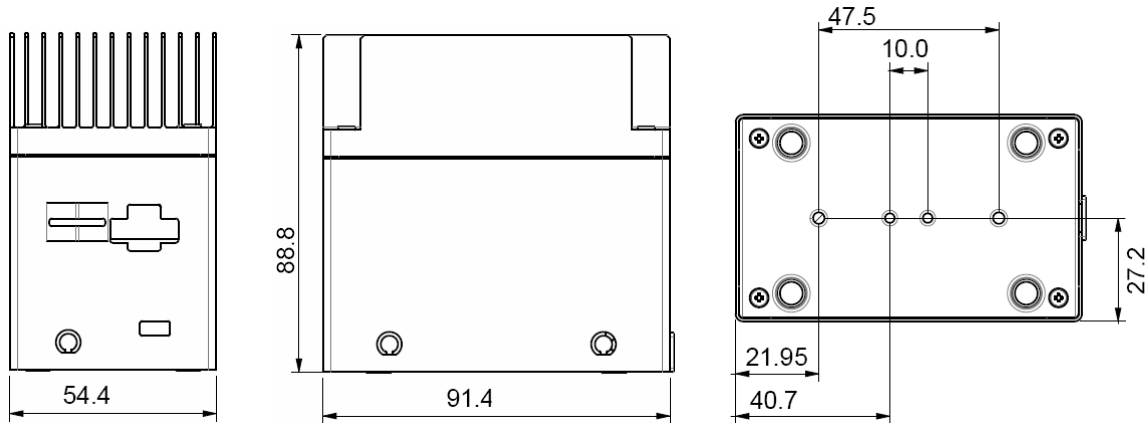
- 1) an LTE/4G module in M.2-3042 format
- 2) an activated Nano SIM card
- 3) the Shuttle accessory WWN01 with two LTE/4G antennas and cables

[5] Optional WLAN function

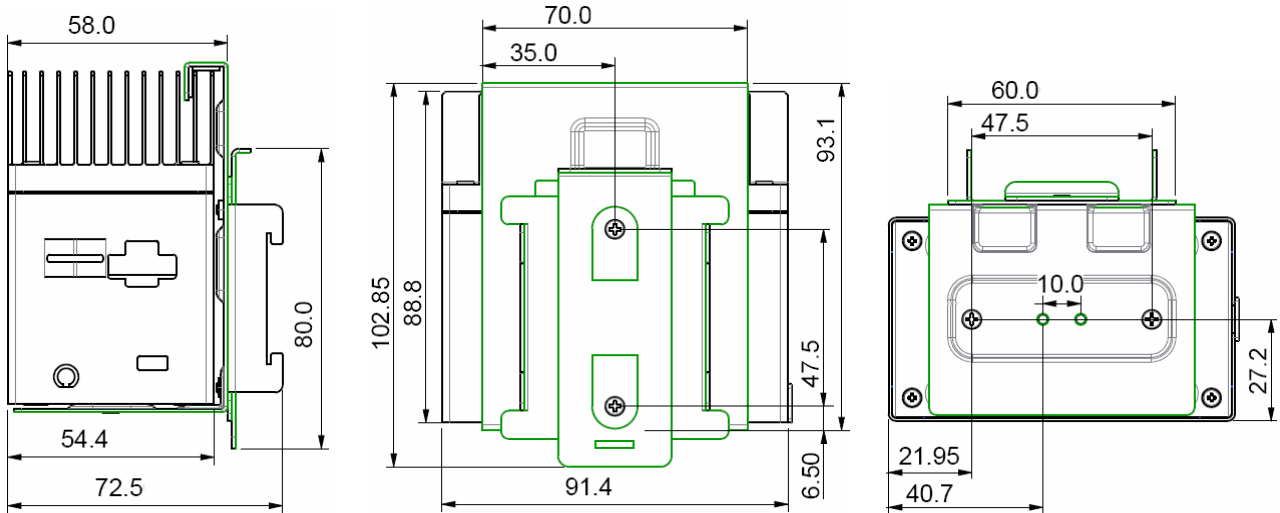
Two accessory products are required to upgrade the PC with a WLAN function:

- 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)

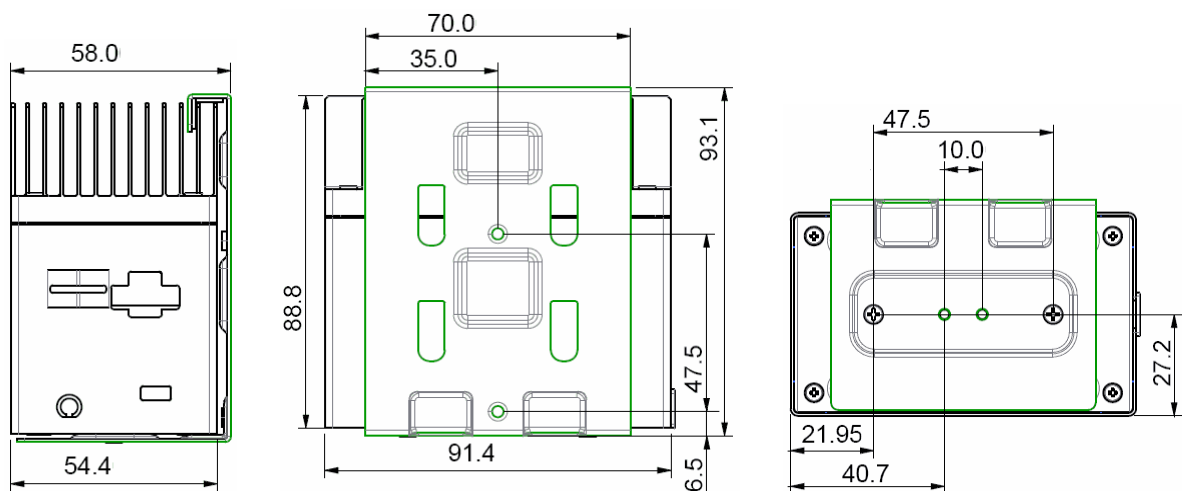
Shuttle Edge EN01 Series – Technical Drawings



DIN Rail Clip



VESA Mount



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