

Edge AI Box 5G Advance

User's Manual

5G Advance : ESC-T4-711-5G



Document: doc02711

Introduction

First, allow us to thank you for your purchase.

Please read this User's Manual carefully so that you can fully utilize the capabilities of this product in a correct and safe manner.

Although this product was shipped after undergoing thorough quality control procedures, we still advise that you perform an operations check prior to use.

Please contact us if the item has sustained damage or does not perform to specifications.

■ About this User's Manual

- The products and specifications contained within this User's Manual may be changed without prior notice due to product revisions or other reasons.
- Reprinting and/or altering this document, either entirely or in part, is prohibited.
- The utmost care was taken in creating this document. Nonetheless, please contact us if there are any points of confusion, errors, or other items that catch your attention.
- Please understand that, even in the cases mentioned above, our company bears no responsibility for outcomes resulting from the use of this product.

■ Trademarks

- Linux is the registered trademark of Linus Torvalds as recognized in Japan and other countries.
- "Wi-Fi" and the "Wi-Fi" logo are registered trademarks of the Wi-Fi Alliance®.
- EDGEMATRIX is a registered trademark of EDGEMATRIX, Inc.
- NVIDIA is a registered trademark of the NVIDIA Corporation.
- Jetson is a trademark of the NVIDIA Corporation.

Revision History

Date of Issue	Version	Revision Details
Sep. 17, 2021	2.1	Added some cautions at SIM insertion
Aug. 12, 2021	2.0	Corrected some typo. English version available.
March 2021	1.0	

Table of Contents

Introduction	2
Revision History	3
Table of Contents.....	4
Safety Precautions.....	5
Cautions During Use	9
1 Overview.....	10
1.1 Key Features of the Edge AI Box 5G Advance	10
1.2 Software Architecture in the Edge AI Box 5G Advance	11
2 Included Items.....	12
3 Component Names and Functions	13
4 Peripheral Device Connectivity	15
4.1 Peripheral devices that can be connected	15
4.2 Connection.....	15
5 BIOS Settings	16
6 Login and Initialization Screen	17
7 Initializing and Swapping the HDD	18
7.1 Initializing the HDD.....	18
7.2 Swapping the HDD.....	19
8 Network Settings.....	20
8.1 Preparing the connectivity environment.....	20
8.1.1 Ethernet.....	20
8.1.2 5G Module.....	21
8.2 Network Settings	24
9 NVIDIA T4 Driver Updates and Commands	26
9.1 Check your NVIDIA T4 Driver.....	26
9.1 Update your NVIDIA T4 Driver	26
10 Other Useful Settings and Applications	29
10.1 Japanese support using fcitx	29
10.2 psensor to monitor CPU/GPU temperature	30
10.3 Take screenshot.....	31
10.4 Edge AI Box NTP Server Build.....	31
11 Closing Edge AI Box 5G Advance.....	32
12 Base Specifications.....	33

Safety Precautions

Please read these Safety Precautions carefully before using this product and only use it as indicated herein. Upon reading this documentation, please store it securely for future reference. Please follow the warnings provided herein, as they are intended to prevent damage to property as well as injury to the user and/or other individuals. The following safety precautions are provided to ensure safe use of this product.

■ Class

The following classes are used to discern the degree of injury and/or damage sustained as a result of inappropriate operation.

 Danger	Point of caution displayed when inappropriate use is likely to result in death and/or serious injury.
 Warning	Point of caution displayed when inappropriate use can result in death and/or serious injury.
 Notice	Point of caution displayed when inappropriate use is expected to result in mild injury and/or physical damage.

■ Code

The following codes are used to distinguish safety precautions.

 Notice	This indicates a general safety precaution.
 Shock Hazard	This indicates the risk of sustaining an electric shock.
 Prohibited	This indicates a general safety precaution.
 Do Not Disassemble	This indicates that disassembly of the product is prohibited.
 Avoid Water	This indicates that handling of the product with wet hands is prohibited.
 Note	This indicates that a specific precaution or usage guideline must be followed.

Danger

 Prohibited	Do not use, store, or leave in an area of high temperature or in an area that may become hot (next to a fire, near a heating device, in direct sunlight, etc.) Fire, injury, and/or electric shock may result.
 Prohibited	Do not allow this product to come in contact with beverages, perspiration, sea water, pet urine, or other fluids. Fire, burns, injury, and/or electric shock may result.
 Prohibited	Do not allow beverages, perspiration, sea water, pet urine, or other fluids to enter the connector unit. Fire, burns, injury, and/or electric shock may result.
 Prohibited	Do not allow contact with, or place upon, sand, dirt, or mud. Moreover, do not touch the product with sandy or otherwise dirty hands. Fire, burns, injury, and/or electric shock may result.
 Do Not Disassemble	Please do not disassemble or alter the product. Fire, burns, injury, and/or electric shock may result.
 Shock Hazard	Do not touch this product or the connector cable during a lightning storm. Electric shock may result.

Warning

 Notice	Disconnect the power cable from the product immediately if the product produces smoke, abnormal odors, abnormal sounds, or if the product becomes too hot to touch. Fire, burns, and/or electric shock may result.
 Prohibited	Do not drop, step on, hit, or otherwise apply strong impact or vibration to the product. Fire, burns, injury, and/or electric shock may result.
 Avoid Water	Do not touch this product or the connector cable with wet hands. Electric shock may result.
 Prohibited	Do not insert the following objects into the product. Fire may result from electric short. <ul style="list-style-type: none"> • Metallic objects • Water or other liquids • Flammable objects • Chemicals

 Prohibited	<p>Only use the provided AC adapter. Fire, electric shock, or smoke may result.</p>
 Prohibited	<p>Do not damage the provided AC adapter cord. Fire and/or electric shock may result.</p>
 Note	<p>Ensure the following points when handling the AC adapter. Fire, electric shock, sparks, and/or smoke may result.</p> <ul style="list-style-type: none"> • Do not use when folded or wrapped up. • Do not excessively bend the base of the cord. • Do not place a heavy load on the cord. • Do not wrap in cloth or other material.
 Prohibited	<p>Do not place on an unstable surface. The item may fall over or drop, causing injury.</p>
 Note	<p>Unplug the power prior to installation/relocation. Electric shock may result.</p>
 Note	<p>Turn off the power prior to connecting or attaching objects to the product. Electric shock may result.</p>
 Prohibited	<p>Be sure to insert the SIM card into the correct location and with the correct orientation. Fire, burns, injury, and/or electric shock may result.</p>
 Note	<p>Store vinyl bags and other wrapping materials out of the reach of children (particularly infants). Inserting these materials in the mouth or around the head can lead to suffocation.</p>
 Note	<p>If the user is wearing an electronic medical device or other such device, check with the device manufacturer and/or seller prior to use to avoid electronic interference. Electronic interference may hinder the normal operation of some medical devices.</p>
 Note	<p>Do not use this produce near electronic devices that employ high-precision controls or weak signals. Electromagnetic waves may interfere with the normal operation of some electronic devices (hearing aids, cardiac pacemakers, etc.)</p>

Notice

 Prohibited	<p>Do not use this device in the following places. Electric shock may result.</p> <ul style="list-style-type: none"> • Baths or other areas with high humidity. • Near stoves, humidifiers, or other places with increased water, humidity, steam, oil smoke, etc.
 Prohibited	<p>Do not directly contact this device while current is running through it or immediately after turning off the power. Burns may result.</p>
 Prohibited	<p>Do not apply excessive force to the antenna. Damage may result.</p>
 Prohibited	<p>Do not use the device if dust has built up on the power plug. Fire may result.</p>
 Note	<p>Be sure to turn off the power and unplug the AC adapter before handling this product. Electric shock may result.</p>
 Note	<p>Unplug the AC adapter when leaving this product unused for an extended period of time. A leakage current fire may result due to degradation of electronic insulation.</p>
 Note	<p>Be careful not to cut your finger on chipped edges when handling the SIM card. Chipped edges can be sharp, resulting in injury.</p>

Cautions During Use

■ Usage Environment

- Avoid areas subject to frequent impact and/or vibration. Also, avoid dropping this product. These conditions may affect the delicate internal components of this product, causing damage and/or loss of functionality.
- Do not use or store this product in direct sunlight, under high temperature, under extreme cold, under high humidity, or in dusty areas. Damage may result.
- Please use the product within the specified temperature and humidity range.
Temperature range: -10 to + 50°C
Humidity range: 10 to 90% (avoid condensation)
- **Do not use this device outdoors.**
- Do not vibrate, impact, or cut the power to this product during data writing or transmission. This may cause loss/corruption of data.

■ Installation

- Do not install near corrosive chemicals or in areas where corrosive gasses may be produced.
- Do not install in areas that allow for contact with substances that are flammable or act as solvents at low temperatures.
- Be sure to turn off the power to this device when attaching and detaching cameras, cables, etc. Attaching/detaching cameras, cables, etc. to this device while powered on can result in damage.
- Do not pull or bend cables, or place a load on the connectors. Damage to the connectors may result.
- Securely tighten all screws.
- Do not insert metallic or other objects into the LTE or Wi-Fi modules. Damage may result.
- Please do not place a load on the LTE module in excess of what is required when inserting/removing the SIM card.
- Do not insert metallic or other objects into the LTE or Wi-Fi modules.

■ Other

- Please turn off the power to this product before cleaning.
- To clean, wipe with a soft, dry cloth. Cleaning with alcohol, paint thinner, benzene, detergent, glass cleaner, or other chemicals may result in damage.
- When transferring or disposing of this product, delete all recorded data. If data remains on the device, it may be nefariously downloaded and used for malicious purposes by a third party.
- If you feel something is malfunctioning with this product, immediately cease operation, cut the power, and contact our company.

1 Overview

The Edge AI Box is a device intended for high-speed AI processing for large amounts of data on-site. The Edge AI Box 5G Advance contains a 5G module that provides support for Sub-6 communication. Moreover, high-speed LTE transmission is available in regions that do not support 5G. A 128 GB NVMe drive comes standard in the Edge AI Box, and users are given the option of two 4 TB HDD or SATA SSD storage for maximum performance. The NVIDIA T4 server GPU contains 320 Turing Tensor Cores, allowing for high-speed Deep Learning inference.

1.1 Key Features of the Edge AI Box 5G Advance

■ NVIDIA T4 (server machine learning GPU) included

The NVIDIA T4 was included for increased performance, and the Turing architecture allows for high-speed inference processing. The camera stream supports simultaneous processing from over 20 devices.

■ Deep Learning

The Edge AI Box 5G Advance is a miniature computer capable of environmental deep learning inference.

■ Edge Computing

Cameras and sensors are located nearby, allowing for real-time data processing. This reduces transmission latency, loss due to data compression, as well as data transmission costs. Moreover, analysis of uncompressed images provides superior precision. Discover hazards in real time and alert alarm systems for immediate risk avoidance.

■ Process data from ubiquitous IoT devices.

This small product can be installed near IoT devices, allowing for ethernet, USB, HDMI, and 5G/LTE compatibility.

■ Standard 128 GB NVMe and two 2.5" 4 TB HDD

The NVMe drive is used for the OS and high-speed inference processing, while two 2.5" 4 TB HDD are used to store data. Users also have the option of switching to a SATA SSD.

■ Includes a 5G communication module

The 5G Advance is compatible with 5G (Sub-6) communication. Moreover, high-speed LTE is available in regions that do not support 5G. The Edge AI Box 5G Advance uses communication to send analysis result logs, samples, metadata, and other information at high speeds to the cloud.

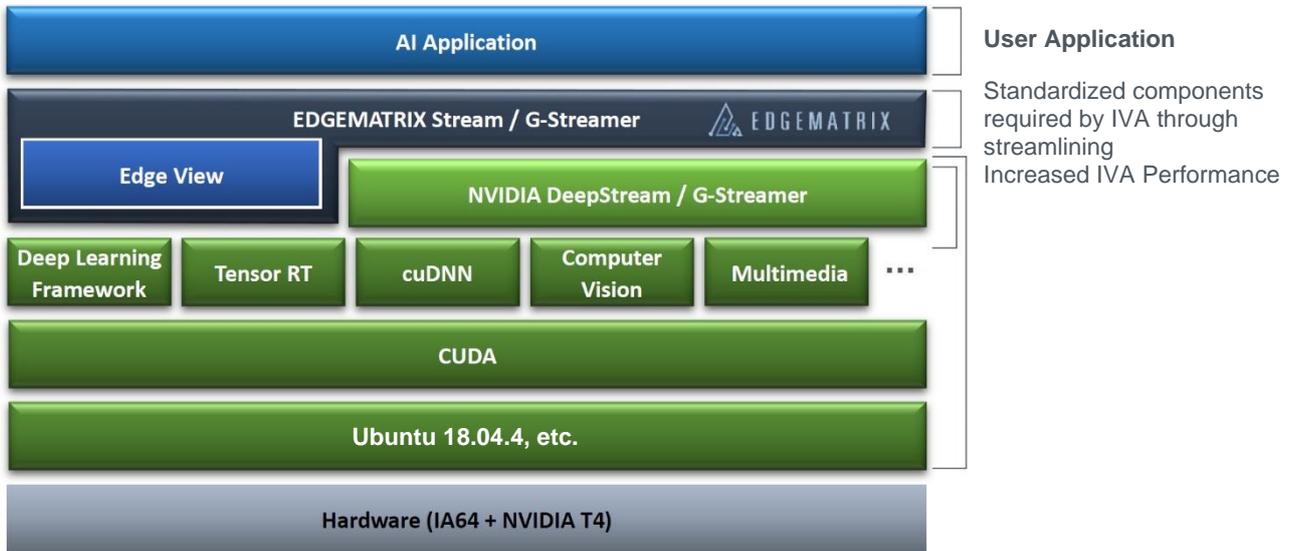
*5G transmission requires a 5G SIM card.

■ Quiet Operation

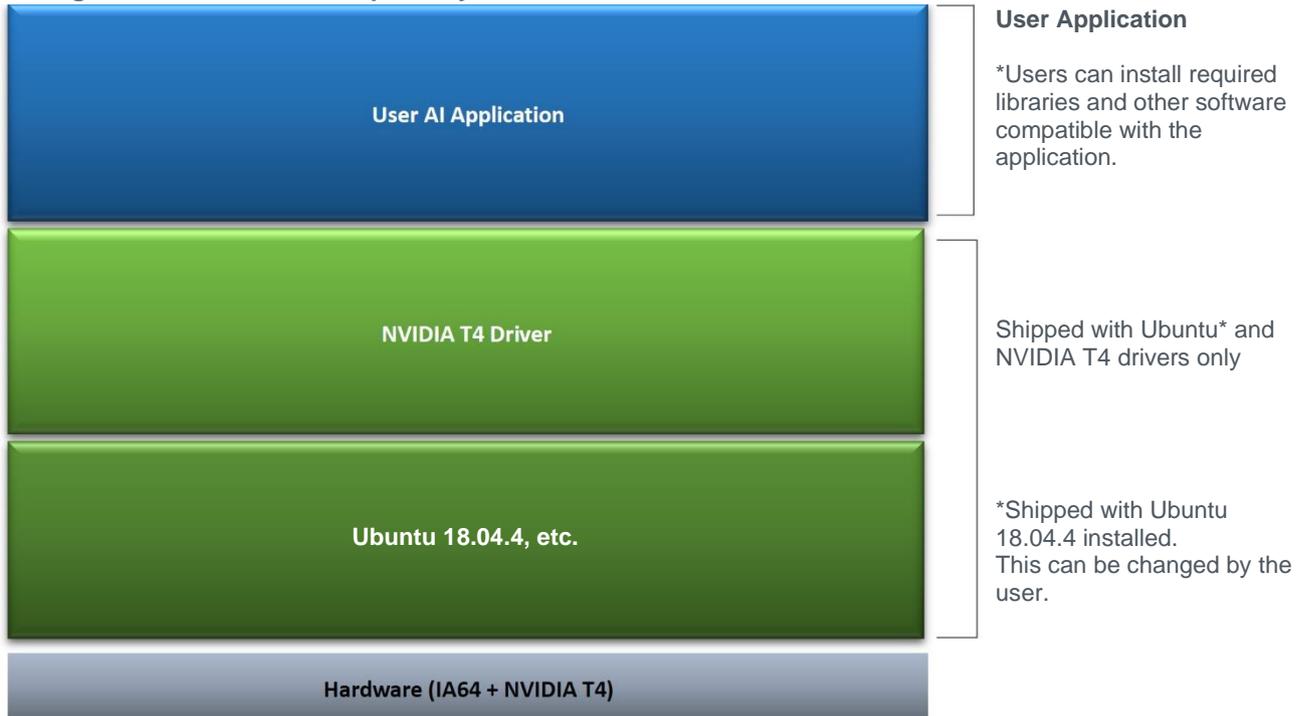
The Edge AI Box 5G Advance uses a smart fan that changes speed depending on the temperature of the NVIDIA T4 GPU.

1.2 Software Architecture in the Edge AI Box 5G Advance

■ EDGEMATRIX® Stream Specifications



■ Edge AI Box Advance - Separately Sold Unit



2 Included Items

This product includes the following items. Please check that all items are present following purchase. If an item is missing, please contact us.

■ Included Items

- Main Unit: 1
- Antenna* 5G: 4
- AC Adapter: 1

■ Options

- None

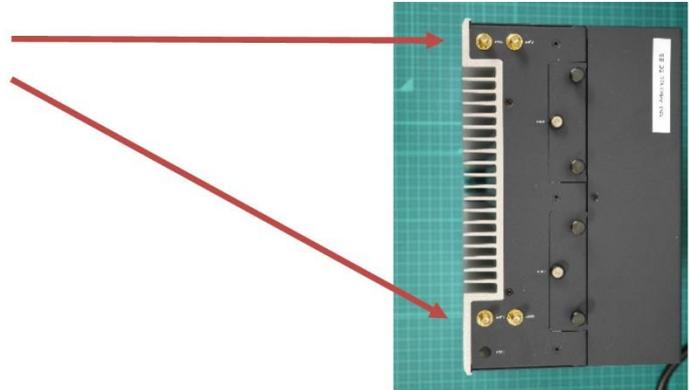
*Please only use the included antennae.

3 Component Names and Functions

4 Antenna connection points

Connect the included 5G antenna here.

* Golden objects in image.

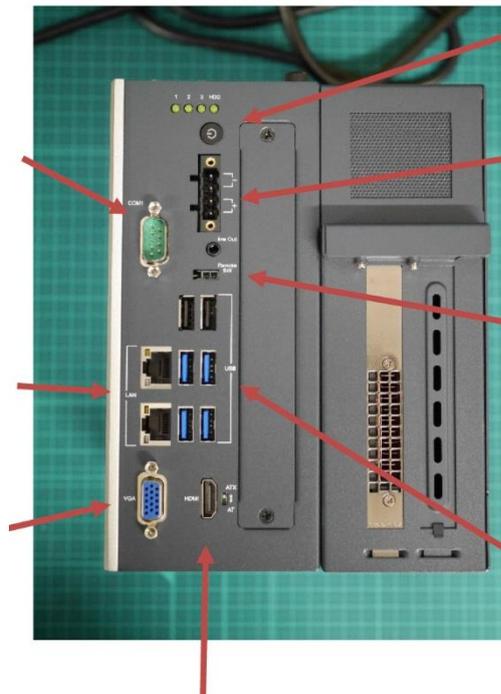


* Attachment of included antenna shown above.

Serial port (RS232)

Ethernet connector x 2
Connects with LAN cable.

VGA Connector
Connects with VGA-compatible monitor.



HDMI Connector
Connects with HDMI-compatible monitor.

Power button

Turns on power to the Edge AI Box 5G Advance.

Power connector

Connects with the included AC adapter.

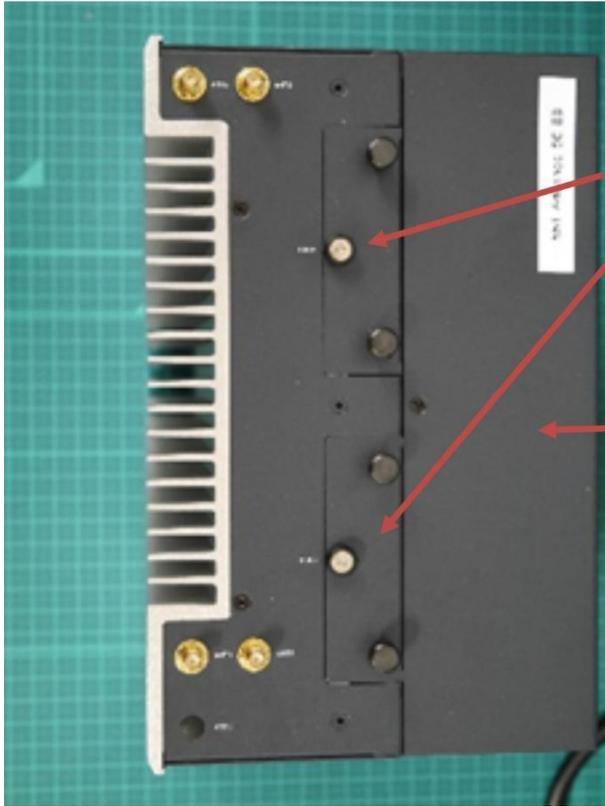
AT-ATX switch

Switch to AT side when power is on for automatic startup.

USB 2.0 connector x 2

USB 3.0 connector x 4

Used for connecting external devices such as keyboards, mice, sensors, FA machine vision cameras, and others.

**HDD port x 2**

Houses 2.5" HDD.

Secure with center screw.

Grasp the two knobs. Pull upwards to remove, and push downwards to load.

Each 4 TB HDD can be loaded separately.

NVIDIA T4 housing unit

The NVIDIA T4 is housed here.

This device depends on air cooling, so please keep this housing covered when in use.

4 Peripheral Device Connectivity

4.1 Peripheral devices that can be connected

The following peripheral devices can be connected to the Edge AI Box 5G Advance. Peripheral devices are supplied by the user.

The following section describes connection with peripheral devices.

- LAN cable
- Keyboard and mouse
- HDMI-compatible monitor
- HDMI cable



About LAN cables

Please use category 5 or higher LAN cable compatible with gigabit ethernet.

Hint

4.2 Connection

- 1 A keyboard and mouse can be connected to the Edge AI Box 5G Advance via the USB connector.
- 2 A monitor can be connected to the Edge AI Box 5G Advance via the HDMI connector.
- 3 The AC adapter plugs into a wall outlet.



- 4 **Press the power button.**
 When the Edge AI Box 5G Advance is turned on, the power button will change from orange to green and Ubuntu will boot up. Shortly afterwards, the Ubuntu login screen will appear.
 * It may take several seconds for the Ubuntu login screen to appear. Please be patient, and do not turn off the power.

5 BIOS Settings

Hold the DEL or ESC key when powering on to enter the BIOS settings.

In the BIOS settings, you can determine settings for each device, as well as chipset, security, boot, and other settings.

This is similar to the BIOS of a PC. A detailed explanation is not provided in this document.



Notice

Please understand that BIOS settings are the responsibility of the user.

If using the EDGEMATRIX service, please do not change the TPM settings. If changed, service may be suspended.

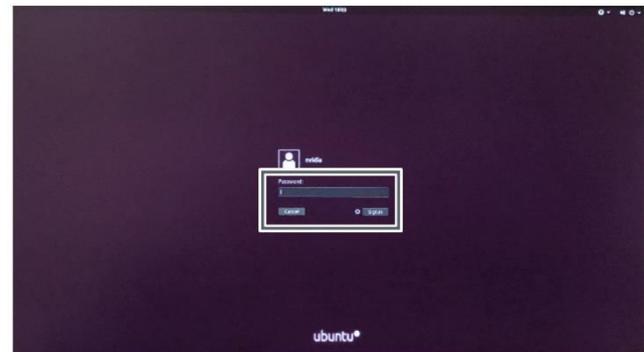
6 Login and Initialization Screen

When connecting peripheral devices to the Edge AI Box Advance, the monitor, mouse, keyboard, or other device will become enabled. After starting up the Edge AI Box Advance, the Ubuntu login screen will appear. Login to Ubuntu to use Edge AI Box Advance. The Ubuntu version is 18.04.4.

- 1 **Click “emi”.**
The password entry screen will appear.



- 2 **Enter “emi” in the password field, then click “Sign in” or press the ENTER key.**
Ubuntu will then login and the desktop will appear.



Notice

For security, please change your Ubuntu password after logging in.

7 Initializing and Swapping the HDD

7.1 Initializing the HDD

The Ubuntu disks application is used to initialize the HDD.

After logging in, click “show applications” below and type “disks” in the search field. Then, select the application shown in the image to the right. The image to the right will show when Japanese is the selected language.



Open the Disks application to see a display as show in the bottom left image. Two 4 TB HDD drives will be shown on the left, and the selected disk contents will be shown on the right. Ubuntu will then install the selected disk.

Some disks are not initialized when shipped. In this is the case, “unknown” will be displayed upon selection as shown in the lower middle image.

Click the gear button on the lower left side of the “unknown” message to initialize the disk.

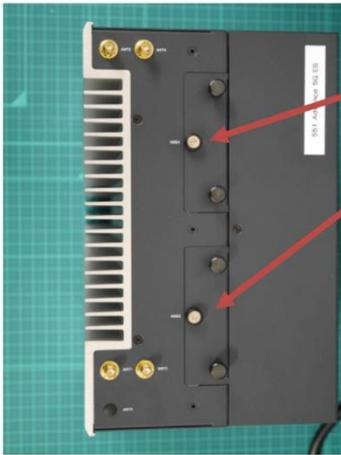
Once the disk is initialized, the bottom right image will appear.

Next, click the PLAY button that newly appears to the left of the gear button to mount the disk.



7.2 Swapping the HDD

Turn off the power when swapping disks.



HDD port x 2

Loosen the screw at the center of the swap port, then grasp the two knobs and pull upwards to remove. Likewise, push downwards to load a disk.



HDD holder

Pull out the HDD holder in the manner shown in the image to the left.



Flip over the HDD holder

Flip over the HDD holder to reveal 4 countersunk screws securing the disk in place.

Remove these screws, exchange the disk, then tighten the screws. Afterwards, return the holder to the main unit.

8 Network Settings

8.1 Preparing the connectivity environment

This is an explanation of the connectivity environments for this product. The user must set up each connectivity environment.



Hint

The Edge AI BOX Advance can connect to 2 or more ethernet, WiFi, or LTE networks. When using 2 or more networks, we recommend using silent routing. Routing can prevent IP packets from degrading.

8.1.1 Ethernet

A monitor can be connected to the Edge AI Box 5G Advance via the HDMI connector. There are two connectors.
 *The LAN is 1000BASE-T.





Hint

Ethernet does not support PoE. If using an IP camera, please use a PoE hub.

8.1.2 5G Module

In addition to the EDGEMATRIX SIM (MVNO using the NTT docomo network), the following SIM providers may be used.

- NTT docomo
- au
- SoftBank (coming soon)



Notice

SIM card

- The Edge AI Box Light uses a standard SIM card. A converter card may be required if you use a microSIM or nanoSIM card.
- Please refer to the instruction manual that came with your SIM card for a detailed explanation of SIM card settings.

SIM card insertion

- Be sure to turn off the Edge AI Box Light and ensure that it is placed on a stable surface prior to inserting a SIM card.
- Do not touch the IC portion of the SIM card.
- Be careful not to bend, crush, or otherwise damage the SIM card.
- LTE cannot be used unless the SIM card is securely inserted into the LTE module.

Body SAR

The Edge AI Box Light does not comply with Body SAR specifications. Please use with the antenna placed at least 20cm from human bodies.

Body SAR

Body SAR regulations apply to devices with antennas placed within 20cm of human bodies.

National guidelines on technical standards for electromagnetic radiation absorbed by the human body, as well as international guidelines on electromagnetic radiation exposure prevention, must be followed.

Such international guidelines include those held by the World Health Organization (WHO), of which permitted values have been determined to be sufficiently safe regardless of the age or health status of the user.

Permitted electromagnetic radiation exposure prevention values proposed by national law and international guidelines express the average electromagnetic energy absorbed by the human body.

SAR (Specific Absorption Rate) defines a tolerable local value of 2.0W/kg (not including from the wrists down, which possess a value of 4.0W/kg).

Please refer to the following website for more details on Body SAR.

Telecommunications Bureau of the Ministry of Internal Affairs and Communications

<http://www.tele.soumu.go.jp/j/sys/ele/index.htm>

■ **SIM card insertion**

SIM cards are inserted into the Edge AI Box 5G Advance.

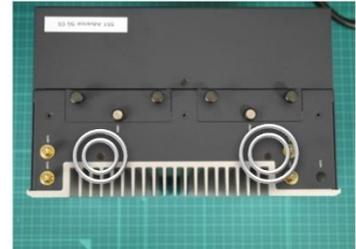


Notice

You may insert a SIM card with referring the following procedure by yourself. Please notify that failures and issues caused by your errors may be out of warranty. EDGEMATRIX Toolkit Box and EDGEMATRIX Service Box covers may not be opened. If you need to open, please contact EDGEMATRIX before opening. If you open without any notice to EDGEMATRIX, the warranty may end.

1 When inserting a SIM card, open from the heat sink side of the housing.

Remove the two screws at the top and bottom positions as shown in the image to the right. Then, remove the heat sink (green portion) from the housing. Next, you will find that heat has caused strong adhesion that requires force to remove. However, be sure not to bend the housing or the heat sink.



2 Once the heat sink is removed, the device should resemble the image to the right.

The image to the right shows the housing with the heat sink removed. The 5G module is located to the upper right. The SIM socket is to the left. The image shows a SIM already inserted. However, no SIM card is included initially.



Be sure not to remove the yellow object attached to the site where the heat sink was removed. This is the heat sink pad, which allows heat to escape from the device via the heat sink. Moreover, heat sink thermal paste is applied to the CPU portion. Please do not remove this paste. If there is insufficient thermal paste, additional store-bought thermal paste may be added.

3 After inserting the SIM as in the image to the right, return the heat sink to complete the process.



Notice

LTE firmware may differ depending on the type of SIM card used. Upon powering on the Edge AI Box following SIM card insertion, a firmware update screen may appear. In this event, do not activate the Edge AI Box's sleep mode and do not turn off the power. Moreover, do not disconnect the network while the firmware is updating.

■ Attaching the 5G antenna

Connect the included 5G antenna to the 5G antenna connector (4 connects located on the top of the device).



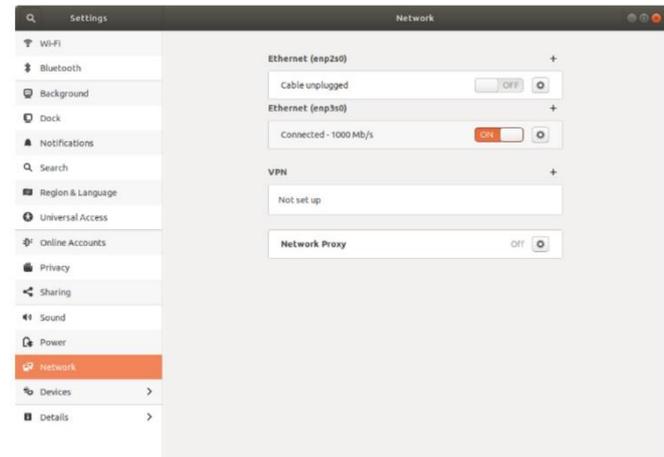
8.2 Network Settings

Use the System Settings function to set up the network.

- 1 Click “show applications” on the lower left of the screen, then click the **System Settings** icon.
The System Settings screen will appear.



- 2 **If using ethernet, select Network.**
The Network settings screen will appear.
 - If working in a DHCP environment, you can usually connect automatically using a LAN cable connection.
 - Clicking on Option will also allow you to set a fixed address.

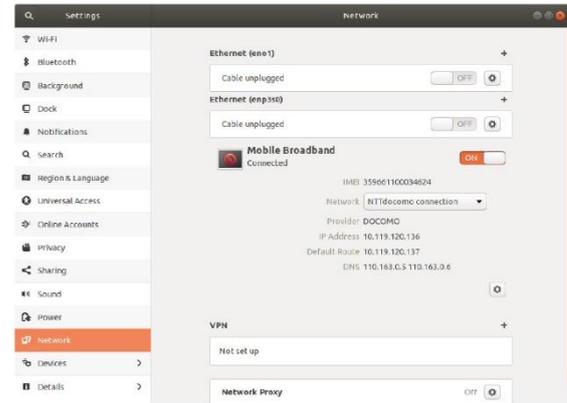
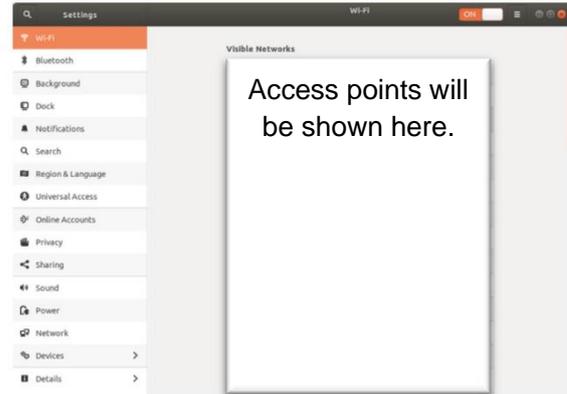


3 If using 5G, select Mobile Broadband.

The network settings screen will appear. Ubuntu does not yet support 5G display, but the settings are the same as for LTE.

Set your country/region, provider, billing plan, APN, and other details in order.

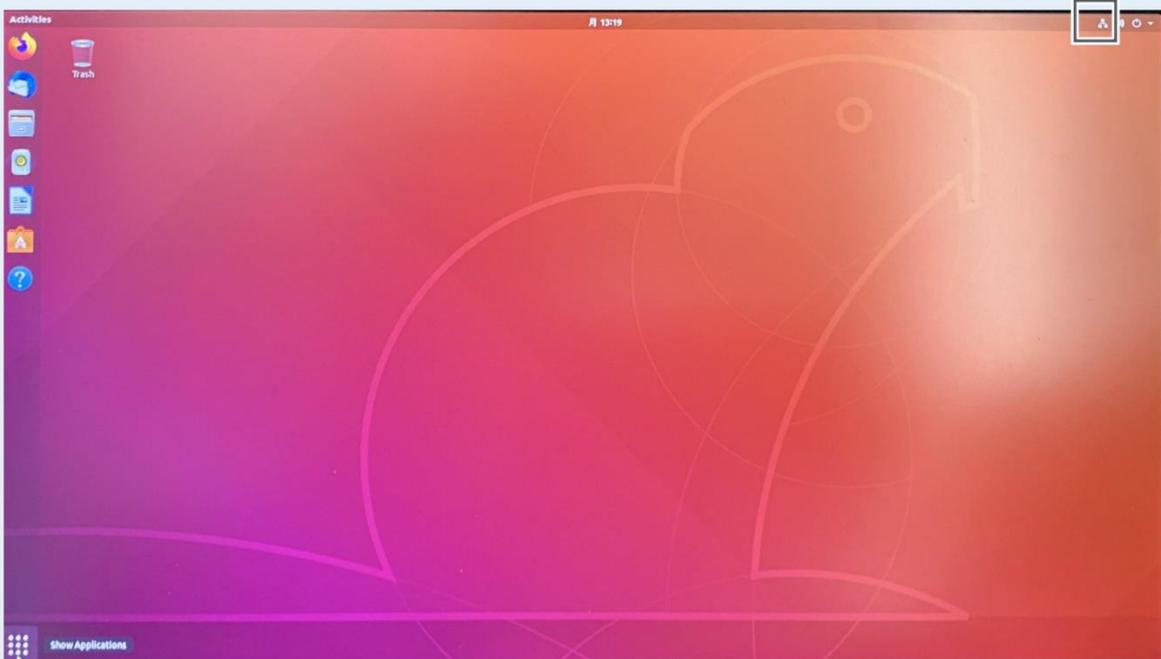
- Clicking on Option will also allow you to set an IP address.



Hint

Network settings from the network status icon

Click the network status icon on the upper right of the desktop to display network status. You can also set network elements here by clicking the different settings.



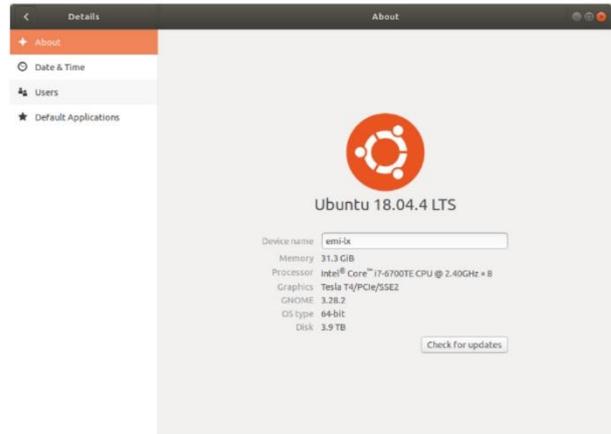
9 NVIDIA T4 Driver Updates and Commands

9.1 Check your NVIDIA T4 Driver

You can check your driver version from System Settings or using the terminal command prompt.

Selecting Details from the System Settings will show the screen in the image to the right. If you see your GPU's name from the Graphics menu on the screen, the appropriate driver is installed and in operation.

*The Tesla T4 is currently called NVIDIA T4.



Alternatively, open the terminal and use the `nvidia-smi` command to check your driver version and GPU name.

9.2 Update your NVIDIA T4 Driver

You can update your driver by making changes under Software & Updates.

Implement Software & Updates from the Applications menu.

Select the Additional Drivers tab to navigate to the Driver selection screen. Then, select the updated driver and click Apply Changes.

As of March 2021, this method does not install the correct Driver. The following outlines our company's installation method.



Driver installation at EDGEMATRIX, Inc.:

- 1) DATACENTER DOCUMENTATION follows the NVIDIA Driver Installation Quick Start Guide.

<https://docs.nvidia.com/datacenter/tesla/tesla-installation-notes/index.html#ubuntu-lts>

```
sudo apt-get install linux-headers-$(uname -r)
distribution=$(. /etc/os-release;echo $ID$VERSION_ID | sed -e 's/¥.//g')
wget https://developer.download.nvidia.com/compute/cuda/repos/\$distribution/x86\_64/cuda-\$distribution.pin
sudo mv cuda-$distribution.pin /etc/apt/preferences.d/cuda-repository-pin-600
sudo apt-key adv --fetch-
keys https://developer.download.nvidia.com/compute/cuda/repos/\$distribution/x86\_64/7fa2af80.pub
echo "deb http://developer.download.nvidia.com/compute/cuda/repos/\$distribution/x86\_64/" | sudo tee
/etc/apt/sources.list.d/cuda.list
sudo apt-get update
sudo apt-get -y install cuda-drivers
```

- 2) Install and set CUDA.

CUDA 10.2

Run the following command to install CUDA 10.2:

```
sudo apt-get -y install cuda-10-2
```

Export the paths for CUDA 10.2 by adding the following lines to your ~/.bashrc file:

```
export PATH=/usr/local/cuda-10.2/bin${PATH:+:${PATH}}
export LD_LIBRARY_PATH=/usr/local/cuda-10.2/lib64${LD_LIBRARY_PATH:+:${LD_LIBRARY_PATH}}
```

Apply the changes:

```
source ~/.bashrc
```

- 3) If you reboot at this point, the UI will not be shown. The following solves the issue of X11 (used by Option B platform).

Fix X11 Incompatibility:

Option A. Wayland

When starting session click on your user, click on settings icon and select Ubuntu on Wayland before enter your password.

Option B. Setting up the xorg.conf file

If Option A didn't work, edit or create the `/etc/X11/xorg.conf` file with the following content before reboot:

```
Section "Device"
    Identifier "Intel"
    Driver "Intel"
    Busid "PCI:0:2:0"
EndSection
```

```
Section "Screen"
    Identifier "Intel"
    Driver "Intel"
EndSection
```

Option C. Installing lightdm

The main issue could be given by the incompatibility between some Gnome versions and NVIDIA drivers. You can check your current display manager name with:

```
cat /etc/X11/default-display-manager
```

A possible output is `/usr/sbin/gdm3`, which is a problematic version. One solution is to install lightdm:

```
sudo apt-get install lightdm
sudo dpkg-reconfigure lightdm
```

Select lightdm instead gdm3 during the installation and you will get X11 working fine.

4) Finally, reboot and check.

Reboot and check the NVIDIA Driver and CUDA installations:

```
nvcc --version
nvidia-smi
```

This process should allow you to use T4 as well as enable X and GNOME onboard graphics settings.

10 Other Useful Settings and Applications

The Edge AI Box Light allows for various configurations in line with different user environments and goals.

Refer to Ubuntu 18.04.4 Documentation

<https://help.ubuntu.com/>

Please refer to the internet or other resources for additional Ubuntu commands.

We will provide an introduction to several useful settings here.

10.1 Japanese support using fcitx

Japanese language is supported by fcitx-mozc.

fcitx-mozc can be installed using the method shown in the figure below (sudo apt install fcitx-mozc) and then rebooting.

Afterwards, users can switch between Japanese and half-width characters using the kanji switch key on the Japanese keyboard.

```

emi@emi-lx: ~
File Edit View Search Terminal Help
emi@emi-lx:~$ sudo apt install fcitx-mozc
[sudo] password for emi:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
 fcitx fcitx-bin fcitx-config-common fcitx-config-gtk fcitx-data fcitx-frontend-all fcitx-frontend-gtk2 fcitx-frontend-gtk3
 fcitx-frontend-qt4 fcitx-frontend-qt5 fcitx-module-dbus fcitx-module-kimpanel fcitx-module-lua fcitx-module-x11 fcitx-modules
 fcitx-ui-classic libdouble-conversion1 libfcitx-config4 libfcitx-core0 libfcitx-gclient1 libfcitx-qt5-1 libfcitx-utils0
 libgettextpo0 liblua5.2-0 libmng2 libmysqlclient20 libpresage-data libpresage1v5 libqt4-dbus libqt4-declarative libqt4-network
 libqt4-script libqt4-sql libqt4-sql-mysql libqt4-xml libqt4-xmlpatterns libqt5score5a libqt5dbus5 libqt5gui5 libqt5network5
 libqt5svg5 libqt5widgets5 libqtcore4 libqtdbus4 libqtgui4 libtinyxml2.6.2v5 libxcb-xinerama0 libzinnia0v5 mozc-data mozc-server
 mozc-utils-gui mysql-common presage qdbus qt-at-spi qt5-gtk-platformtheme qtchooser qtcore4-l10n qttranslations5-l10n
 tegaki-zinnia-japanese
Suggested packages:
 fcitx-m17n fcitx-tools kdialog plasma-widgets-kimpanel libqt4-declarative-folderlistmodel libqt4-declarative-gestures
 libqt4-declarative-particles libqt4-declarative-shaders qt4-qmlviewer libqt4-dev qt5-image-formats-plugins qtwayland5 libicu55
 qt4-qtconfig ibus-qt5
The following NEW packages will be installed:
 fcitx fcitx-bin fcitx-config-common fcitx-config-gtk fcitx-data fcitx-frontend-all fcitx-frontend-gtk2 fcitx-frontend-gtk3
 fcitx-frontend-qt4 fcitx-frontend-qt5 fcitx-module-dbus fcitx-module-kimpanel fcitx-module-lua fcitx-module-x11 fcitx-modules
 fcitx-mozc fcitx-ui-classic libdouble-conversion1 libfcitx-config4 libfcitx-core0 libfcitx-gclient1 libfcitx-qt5-1
 libfcitx-utils0 libgettextpo0 liblua5.2-0 libmng2 libmysqlclient20 libpresage-data libpresage1v5 libqt4-dbus libqt4-declarative
 libqt4-network libqt4-script libqt4-sql libqt4-sql-mysql libqt4-xml libqt4-xmlpatterns libqt5score5a libqt5dbus5 libqt5gui5
 libqt5network5 libqt5svg5 libqt5widgets5 libqtcore4 libqtdbus4 libqtgui4 libtinyxml2.6.2v5 libxcb-xinerama0 libzinnia0v5
 mozc-data mozc-server mozc-utils-gui mysql-common presage qdbus qt-at-spi qt5-gtk-platformtheme qtchooser qtcore4-l10n
 qttranslations5-l10n tegaki-zinnia-japanese
0 upgraded, 61 newly installed, 0 to remove and 195 not upgraded.
Need to get 50.1 MB/57.8 MB of archives.
After this operation, 162 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
    
```

10.2 psensor to monitor CPU/GPU temperature

This is a useful application for monitoring the temperature of the CPU and GPU. Install using the command `sudo apt install psensor`.

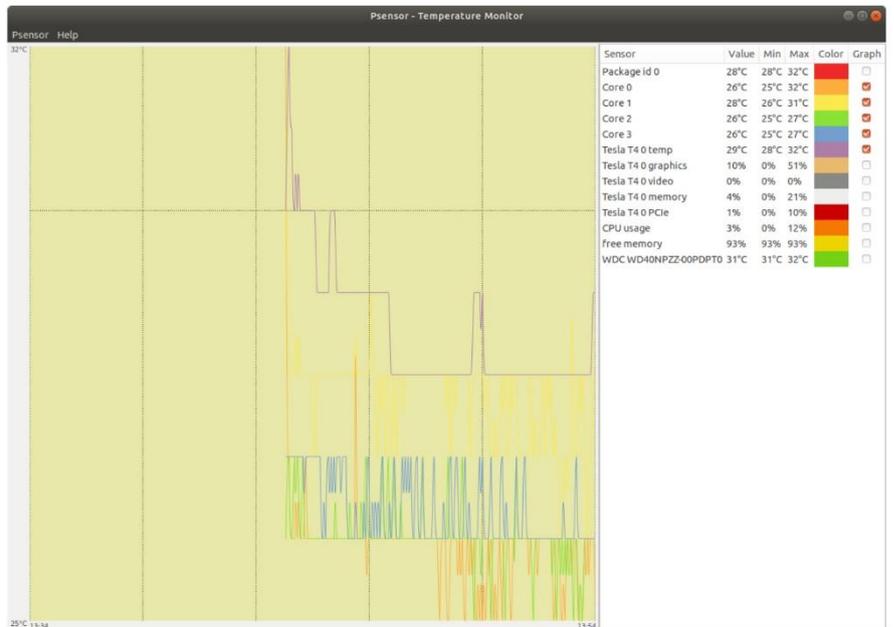
```

emi@emi-lx: ~
File Edit View Search Terminal Help
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

emi@emi-lx:~$ sudo apt update
[sudo] password for emi:
Hit:1 http://jp.archive.ubuntu.com/ubuntu bionic InRelease
Hit:2 http://jp.archive.ubuntu.com/ubuntu bionic-updates InRelease
Hit:3 http://jp.archive.ubuntu.com/ubuntu bionic-backports InRelease
Get:4 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Get:5 http://security.ubuntu.com/ubuntu bionic-security/main amd64 DEP-11 Metadata [43.7 kB]
Get:6 http://security.ubuntu.com/ubuntu bionic-security/main DEP-11 48x48 Icons [25.7 kB]
Get:7 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 DEP-11 Metadata [49.2 kB]
Get:8 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 DEP-11 Metadata [2,464 B]
Fetched 210 kB in 3s (62.2 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
195 packages can be upgraded. Run 'apt list --upgradable' to see them.
emi@emi-lx:~$ sudo apt install psensor
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  psensor-common
The following NEW packages will be installed:
  psensor psensor-common
0 upgraded, 2 newly installed, 0 to remove and 195 not upgraded.
Need to get 98.9 kB of archives.
After this operation, 589 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://jp.archive.ubuntu.com/ubuntu bionic/universe amd64 psensor-common all 1.1.5-1ubuntu3 [40.5 kB]
Get:2 http://jp.archive.ubuntu.com/ubuntu bionic/universe amd64 psensor amd64 1.1.5-1ubuntu3 [58.4 kB]
Fetched 98.9 kB in 1s (101 kB/s)
Selecting previously unselected package psensor-common.
(Reading database ... 133259 files and directories currently installed.)
Preparing to unpack .../psensor-common_1.1.5-1ubuntu3_all.deb ...
Unpacking psensor-common (1.1.5-1ubuntu3) ...
Selecting previously unselected package psensor.
Preparing to unpack .../psensor_1.1.5-1ubuntu3_amd64.deb ...
Unpacking psensor (1.1.5-1ubuntu3) ...
Setting up psensor-common (1.1.5-1ubuntu3) ...
Setting up psensor (1.1.5-1ubuntu3) ...
Processing triggers for mline-support (3.60ubuntu1) ...
Processing triggers for desktop-file-utils (0.23-1ubuntu3,18.04.2) ...
Processing triggers for libgl1:amd64 (2.56.4-0ubuntu0,18.04.4) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...#
Processing triggers for gnome-menus (3.13.3-11ubuntu1) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
emi@emi-lx:~$

```

Temperature changes vs. time can be clearly visualized as a graph like in the image to the left.



10.3 Take screenshot

Screenshot is a function that comes pre-installed. Simply select it from the applications menu for quick use.

10.4 Edge AI Box NTP Server Build

Some users may want to turn their AI BOX into an NTP server to synchronize systems. The following is a process for turning the AI BOX into an NTP server.

This method can also be used to synchronize IP cameras.

```
* ntp installation
# apt -y install ntp
```

```
* Editing settings
```

```
# vi /etc/ntp.conf
```

```
* Add a # to comment out Line 21 starting with "pool",
```

```
* then add the server below
```

```
server ntp.nict.jp iburst
```

```
server ntp1.jst.mfeed.ad.jp iburst
```

```
server ntp2.jst.mfeed.ad.jp iburst
```

```
* When synchronizing IP cameras, there are a few restricted settings in the form of the following additions
```

```
restrict 192.168.0.0 mask 255.255.255.0 nomodify notrap
```

```
* If the camera side NW IP is 192.168.0.xxx. Camera settings are required to synchronize with AI BOX. Refer to the camera manual.
```

```
* save complete wq!
```

```
# systemctl restart ntp
```

```
* ntp re-initialization
```

```
End.
```

11 Closing Edge AI Box 5G Advance

When you finish using the Edge AI Box 5G Advance, shut down Ubuntu and turn off the power.

- 1 Click the power icon at the upper right of the desktop.**

A Power Off screen will appear.



- 2 Click Power Off.**

Ubuntu will shut down, and Edge AI Box Advance will power down.

*If you wish to reboot Edge AI Box Advance, click Restart.



12 Base Specifications

OS	Ubuntu (18.04.4) NVIDIA T4 driver	
CPU, etc.	Processor	GPU NVIDIA T4 Turing Tensor Core CPU 6 th /7 th Intel i7 (Kaby Lake/SkyLake)
	Memory	2 x DDR4-2133/2400 un-buffered SO-DIMM, 32GB
	Storage	M.2 128GB NVMe, 2 x 2.5" swappable HDD (15mm high) 4TB
	System IO Outlet	3 x Switches for power on/off (ATX), Remote, Reset 2 x 10/100/1000 Mbps Ethernet (Intel® i211-AT) 4 x USB3.0 1 x HDMI, 1 x VGA 1 x Audio (Mic-in/Line-out) 2 x SMA type connector opening for antenna
	NVIDIA T4	320 Turing Tensor Core, 2,560 CUDA cores
5G	5G	docomo/au/softbank (planned)
	5G communication	Sub-6-only support LTE automatic switching
PoE	None	
Power	24V/230W Universal AC Power Adapter (please use the included power adapter)	
Operational temperature range	-10~+50°C	
Operational humidity range	10 to 90% (avoid condensation)	
Vibration	2Grms w/M.2 (5~500Hz, X, Y, Z)	
Outer Dimensions (width x height x depth)	147.5 mm (5.80") (W) x 230 mm (9.04") (D)x 192 mm (7.54") (H)	
Weight	4.935kg (10,14lb)	
Certification	CE & FCC 5G Certifications	

Contact Us

EDGEMATRIX, Inc.

〒150-0034

8-7 Daiwa Daikanyama Building, Daikanyama-cho, Shibuya-ku, Tokyo

TEL: 03-6778-8525

E-mail: device_support@edgematrix.com

HP: <https://edgematrix.com/>