

PLEN Cube PC020B

Instruction Manual

(Crowd-funding model: equipped with an onboard battery and display screen) (191105-1)

Thank you for purchasing PLEN Cube.

Please read this manual in its entirety for the correct use of this product before operation.

- PLEN Robotics Inc is not liable for any damages or accidents caused by failing to observe the items and precautions described.
- The diagrams and illustrations provided in this manual are representations. Actual images and form may differ in the received product.
- Specifications are subject to change without notice for product improvements.
- Unauthorized copying or reproduction of any of the contents of the product or this document is prohibited.



【 Precautions for Safe Operation】

PLEN Cube is a precision machine and there are many moving parts. If used incorrectly, it may lead to the failure of a mechanism / electronic component, or result in a serious accident. Please begin operation only after fully reading and acknowledging the full contents and precautions of this manual:

- Do not let any water or dirt into any cracks, holes, or components of the product
- Do not store, charge, or use the product in excessively hot or humid environments, near fire, or near water sources (ie: baths, lakes, etc...)
- Do not use or leave the product on an unstable or unbalanced surface
- Never open, disassemble, or modify any components of the PLEN Cube or its accessories
- Use and store out of reach of small children.
- Use and store out of reach of pets.
- Do not forcefully impede, manually move, apply a strong force, or torque to any actuating or moving parts. Forcefully moving components beyond their intended range may damage the mechanisms.
- Do not operate with wet hands.
- Always operate within easy reach and turn off the power when not operating or leaving the product unattended for extended periods of time.
- Do not attempt to charge the device with any charger other than the one provided.
- Do not insert any wires, tools, or other invasive objects into the openings
- Do not operate when there is an abnormality or malfunctioning component due to failure or damage, including water damage.
- Be careful to keep fingers away from the moving parts.
- If there are any unusual smells, smoke, or sounds, immediately turn off the power and stop using the product.
- Follow the instructions of your local municipality when disposing of the PLEN Cube as would be done for other electronic devices and batteries.

【 Battery Charging 】

The PLEN Cube is equipped with a lithium-ion battery. Improper operation may significantly shorten the battery life, damage the battery, or cause fire. Please read the following carefully and follow the instructions provided for use and charging:

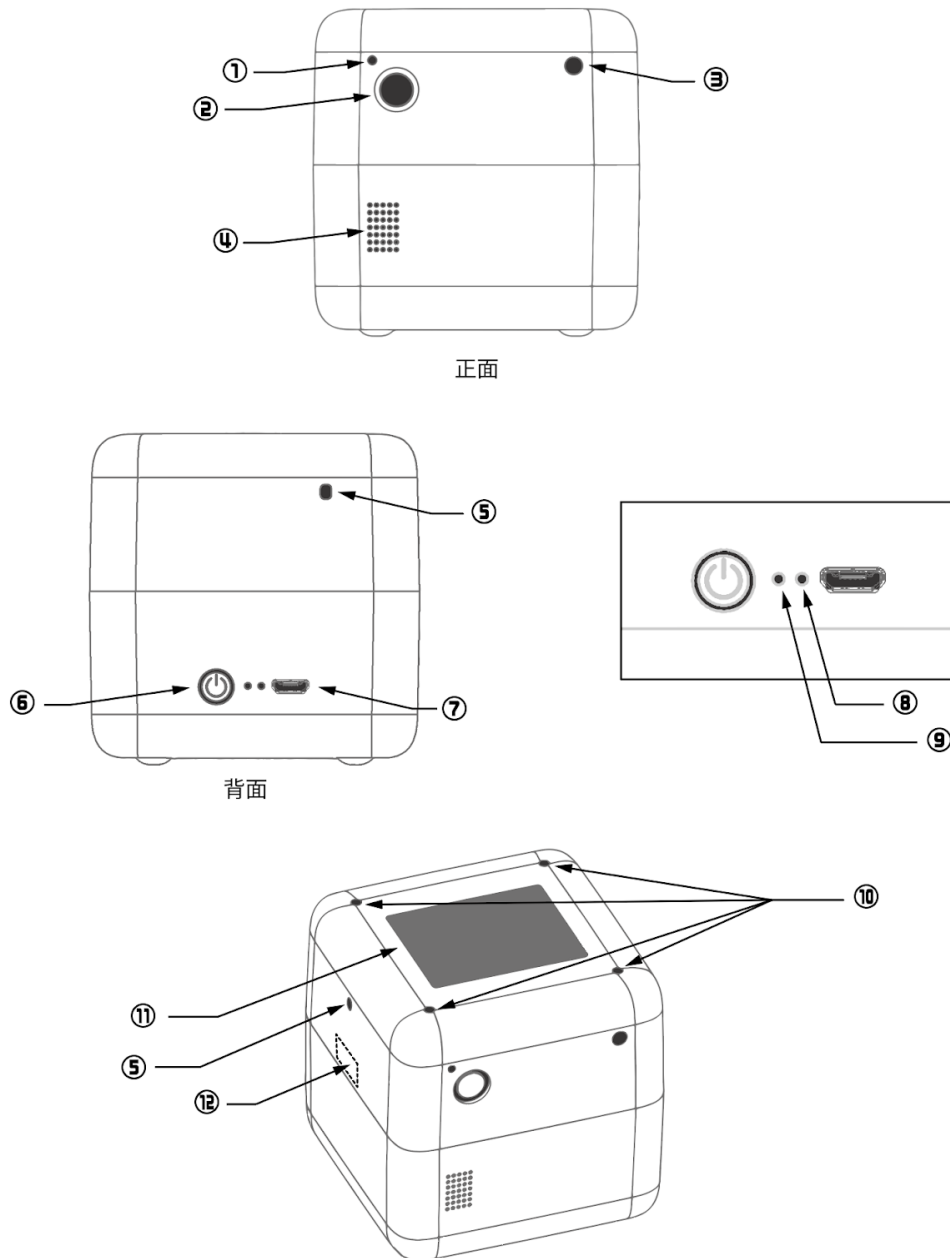
- Use the charger provided with the PLEN Cube to charge the device. The charger is for domestic use only.
- Follow the precautions and directions of use of the charger as listed on the adapter.
- Please charge the device at least once every six months to prevent any shortening of the battery life.
- Do not hit, drop, or apply any impact shock to the device while charging
- When unplugging the charging cable, hold and pull from the head of the connector and not the cable



【 Components 】

- x1 PLEN Cube main unit
- x1 USB charging adapter

<Component naming and location>



- ① LED light (white)
- ② Camera
For photos, videos, and face recognition functionalities
- ③ Motion sensor
Not used in this model
- ④ Speaker
- ⑤ IR (infrared) remote control
For recording and sending IR signals to control home appliances
- ⑥ Power switch
- ⑦ USB micro-B terminal
For charging the battery
- ⑧ Status LED (red)
Illuminated while the battery is charging
- ⑨ Status LED (green)
Indicates the current status of the PLEN Cube such as startup (solid illumination) and errors (flashing)
- ⑩ Microphone x4
Mounted on the upper surface of the PLEN Cube head. Used for sound direction recognition, voice recognition, and general sound recording
- ⑪ LCD display (Only for models with LCD)
Displays symbols, images, and information.
- ⑫ Built-in antenna
Located on the inside wall of the PLEN Cube head. Covering with hands or objects may affect connectivity.



【 Charging the PLEN Cube 】

Before turning the PLEN Cube on please completely charge the battery. Insert the USB micro-B connector side of the charging adapter in the proper orientation into the charging terminal located on the back of the bottom half of the PLEN Cube.



- ※ Please charge the PLEN Cube using only the provided charging adapter
- ※ If the adjacent status LED light is **flashing red**, immediately remove the USB connector from the terminal and stop using it.

【 First-time Operation 】

A smartphone, tablet, or computer is required for initial setup.

< Network setup >

This section will describe how to connect the PLEN Cube to a local WIFI network.

The PLEN Cube will automatically try to connect to the most recently setup network proceeding the initial operation and setup. The PLEN Cube will voice its IP address of the current connected network during start-up. If the PLEN Cube cannot recognize or connect to any available networks, the network setup procedure must be conducted again.

Please follow the described steps whenever connecting to a new network.

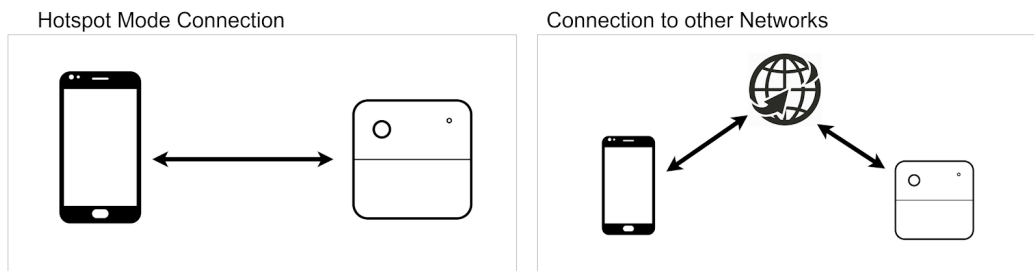
1. Turn on the PLEN Cube by pressing and holding the power switch button, located on the back of the bottom half of the PLEN Cube, for **3 full seconds**. When the start-up procedure begins, the front white LED light will turn on for a short time. Please wait approximately **1 minute** for the start-up process to fully complete.

For the first time start-up, the PLEN Cube will be in hotspot mode and the fixed IP address will be **【10.42.0.1】**

When the PLEN Cube is connected to a network, it will voice its IP address within that connected network, which may differ between different networks.

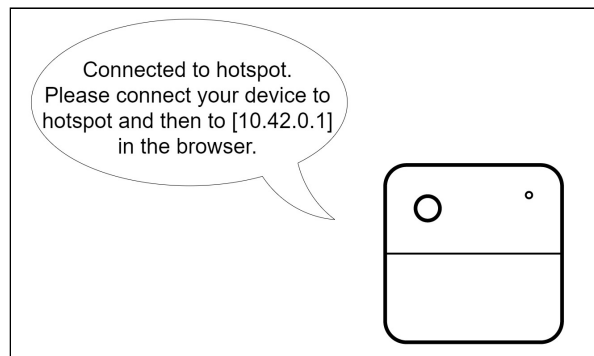


2. For the first time use or when the PLEN Cube is not connected to any network, the PLEN Cube will start-up in “**Hotspot Mode.**” From Hotspot Mode, please follow the following steps to connect to a new network.



3. The PLEN Cube creates its own limited WIFI network while on HotSpot Mode. On the smartphone, tablet, or PC device, please open the list of available WIFI networks and change the current network to the hotspot created by the PLEN Cube beginning with **<plencube... >**. When asked for a password, please input the security key **<plencube>.(※)**

※Password should be entered **without** the angle brackets “<” and “>”



4. While connected to the “plencube...” hotspot network, open a web browser (Google Chrome recommended) and enter the hotspot IP address of the cube: **【10.42.0.1】** and the network connection screen for the PLEN Cube will be displayed.

When the PLEN Cube has successfully connected to the entered network, it will voice the name of the network it has connected to and follow by voicing its new IP address within this network. **Please note this new IP address voiced by the PLEN Cube and do not lose it.**

The complete functionality of the PLEN Cube cannot be used until the user registration has been completed.

※ *In the event the voiced IP address was lost or misunderstood, please turn off the PLEN Cube by pressing and holding the power switch for 5 full seconds and then turn the PLEN Cube back on by holding the power switch for 3 full seconds. During this new start-up, the PLEN Cube will again voice the network name and IP address it is currently connected to. It is important to take note of this voiced network and IP address to connect to the PLEN Cube.*

※ *If the PLEN Cube voices the hotspot network and IP address, or starts up in Hotspot Mode after turned on, the connection to the networks known by the PLEN Cube has failed. This procedure to connect to a network from the PLEN Cube hot spot must be repeated.*

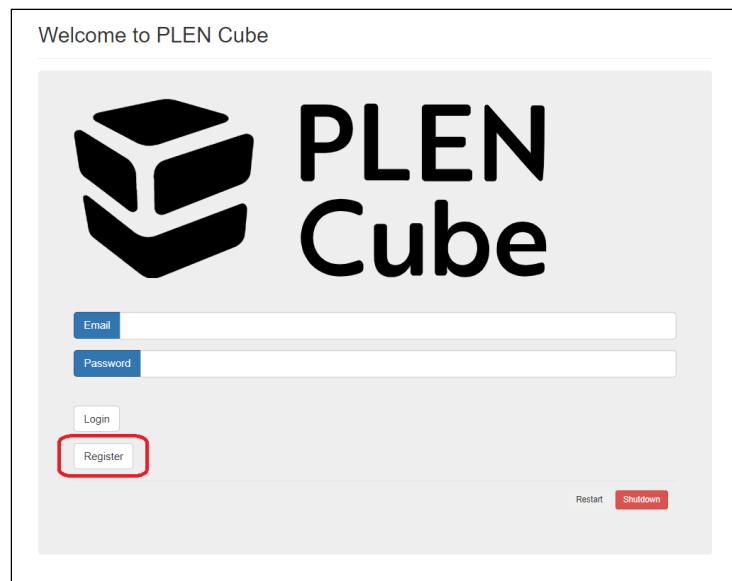
※ *Please conduct the network connection procedure in a location to the WIFI network where the*



connectivity is strong.

✂ It will not be possible to connect the PLEN Cube to networks with 2-step verification that may be used in certain companies, schools, or other protected organizations.

5. Close the browser used to input the desired WIFI network. Again open list of available networks on the smartphone, tablet, or PC and connect the device to the **same network** that the PLEN Cube was connected. Open a new web browser search bar and input the new IP address voiced by the PLEN Cube and the PLEN Cube application will once again be displayed on the screen.



Welcome to PLEN Cube

PLEN Cube

Email

Password

Login

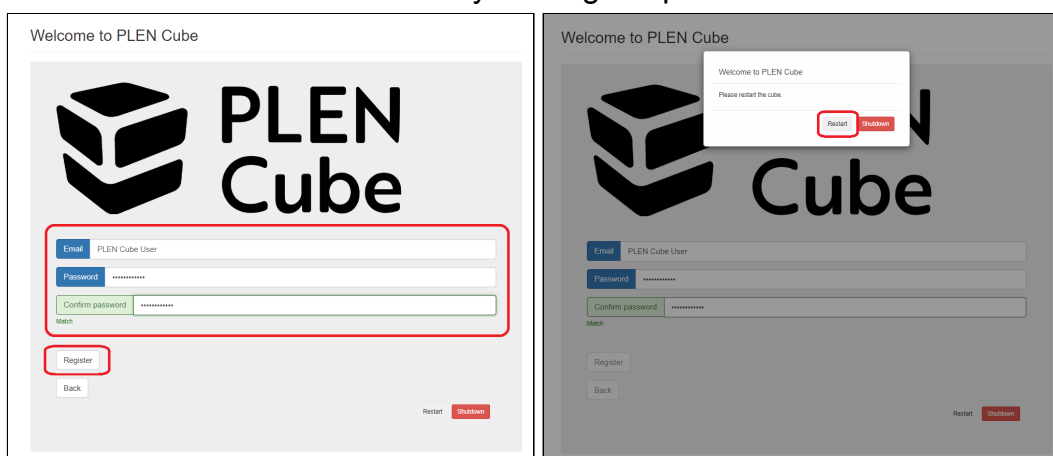
Register

Restart Shutdown

When connecting with a smart device to the PLEN Cube that is also connected to the internet, the user registration page will be displayed.

6. User registration is required to begin using the PLEN Cube. New users who are also **Crowdfunding Backers** of the PLEN Cube can register for **free**.

Enter a valid mailing address and desired password for the new PLEN Cube account to be associated, confirm the new registration, and restart the PLEN Cube by clicking the “Restart” button, or by pressing and holding the power switch for 5 full seconds and then turn the PLEN Cube back on by holding the power switch for 3 full seconds.



Welcome to PLEN Cube

PLEN Cube

Email PLEN Cube User

Password

Confirm password

Match

Register

Back

Restart Shutdown

Welcome to PLEN Cube

Please restart the cube.

Restart Shutdown

Email PLEN Cube User

Password

Confirm password

Match

Register

Back

Restart Shutdown



While the PLEN Cube is connected to a WIFI network with internet access, the intended functionalities such as weather reports, IFTTT control, music services(※), and firmware updates will be carried out normally.

※Music functionality is not implemented as of October 2019 and access is scheduled for 2020.

Initial set up has now been completed



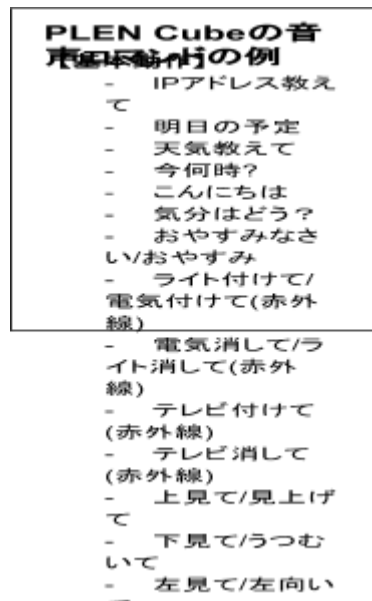
【 How to use the PLEN Cube 】

1. Voice commands

Basic functionalities of the PLEN Cube can be controlled through the use of speaking the trigger word followed by a command word.

Begin by speaking the trigger word “**Hirakegoma**” (hee-rah-kay-goh-mah), meaning “open sesame” in Japanese. If the PLEN Cube has successfully heard and understood the trigger word, it will turn to face the user and a “pong” sound will be heard. The user can then voice one of the following commands in a clear, slow voice.

<This will definitely need an english translation >



If no command is given, or the command is not recognized by the PLEN Cube, the device will gesture misunderstanding and no commands will be carried out.

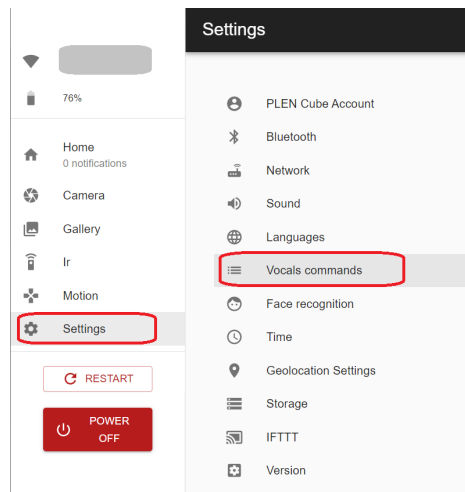
The trigger word **must** be voiced before giving any command word. A command word will not be carried out if the trigger word is not first clearly stated, or if the command is not given to the PLEN Cube within the default listening period of 7 seconds.

2. Web Application

It is also possible to control the PLEN Cube using a smart device or PC that is connected to the same network as the PLEN Cube.

A list of the voice control commands can be found in the “Settings” tab in the menu on the web application and then select “Voice Commands.”



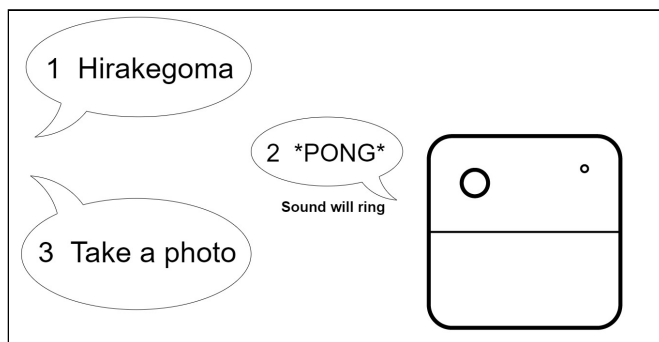


【 Camera Functionality Instructions 】

There is a camera mounted on the top half of the PLEN Cube that can be used for photos, videos, and panorama capturing.

<Taking photographs and videos >

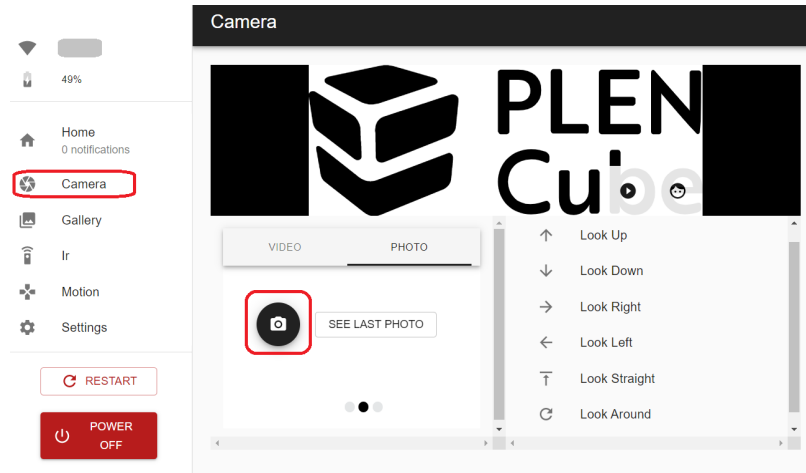
1. Speak the trigger word “**Hirakegoma**” to the PLEN Cube in a slow and clear voice and wait for the PLEN Cube to completely finish moving and a “pong” sound will be heard from the PLEN Cube’s speaker.
2. Say clearly the command “**take a photo.**” The PLEN Cube will then ring 3 “pong” sounds followed by the sound of a camera shutter.
3. The photo or video that was just taken will be displayed on the screen on the top of the PLEN Cube.



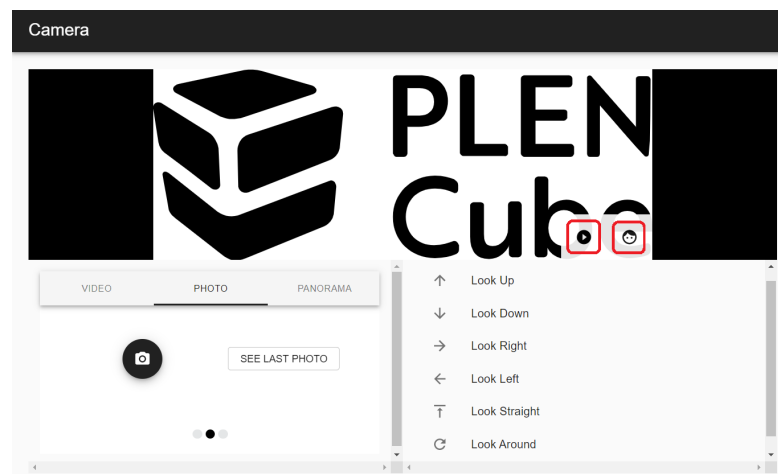
Videos can also be captured following the same steps described above. However, in step 2, instead speak the command “**take a video.**” The default video length is 15 seconds.

Photos, videos, and other camera functionality can also be controlled with the web application under the “Camera” tab in the drop down menu on the left of the PLEN Cube web application.





The camera functionality can also be controlled manually in this page by selecting the camera icon or play icon to take photos or videos respectively. The camera and video settings can also be changed here to adjust the length of time a video can be recorded. The maximum length possible that can be captured is 15 minutes in one recording. The video recording will automatically stop after the maximum time has elapsed.



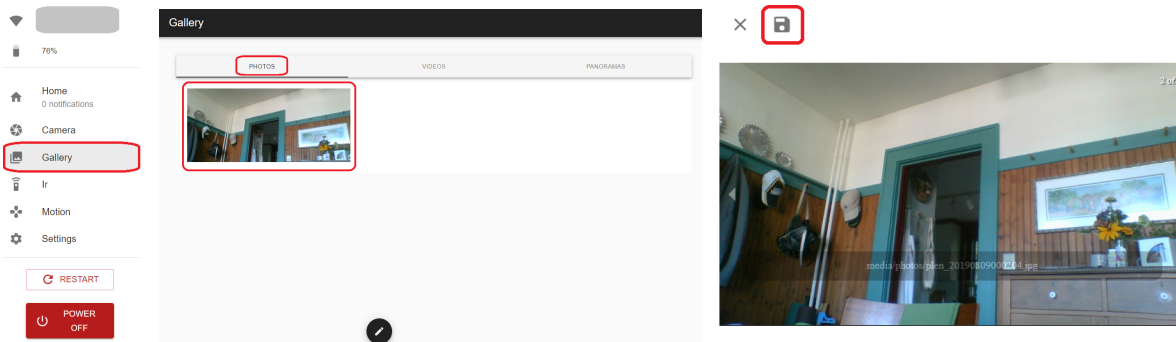
※ After recording a video, the PLEN Cube must process it. During this time, use of the camera will not be possible. Video processing length depends on the size and length of the video file recorded.

Selecting the icon of a face in the Camera menu will activate the face-tracking functionality of the PLEN Cube. While this command is active, the camera will follow the user's face.

<Captured Photos and Videos>

Captured photos and videos will be saved in the internal memory storage of the PLEN Cube. These will be found in the "Media" tab of the drop down menu on the PLEN Cube web application. The captured media are organized into three categories: photo, video, and panorama. Selecting the desired tab and captured image will give the user the option of saving or deleting the file.





【 Music Streaming Services 】

The PLEN Cube has the ability to connect to various internet streaming platforms (KKBOX, Tidal, Napster). However, this functionality is not currently available. Music services will be offered beginning in the year **2020**.

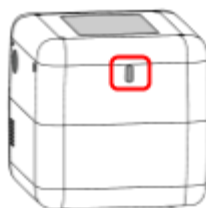
【Infrared (IR) Remote Control Instructions】

The infrared output (sending) LEDs are located on the left, right, and back faces of the PLEN Cube, while the input (IR signal receiver) is located on the right face with one of the output LEDs. The receiver is capable of recording IR inputs from other device signals (ie: IR remote controls for televisions, air conditioners, IR controlled lights, etc...).

※As of October 2019, the voice commands “TV On” / “TV Off” / “Light On” / “Light off” have been implemented and are available.

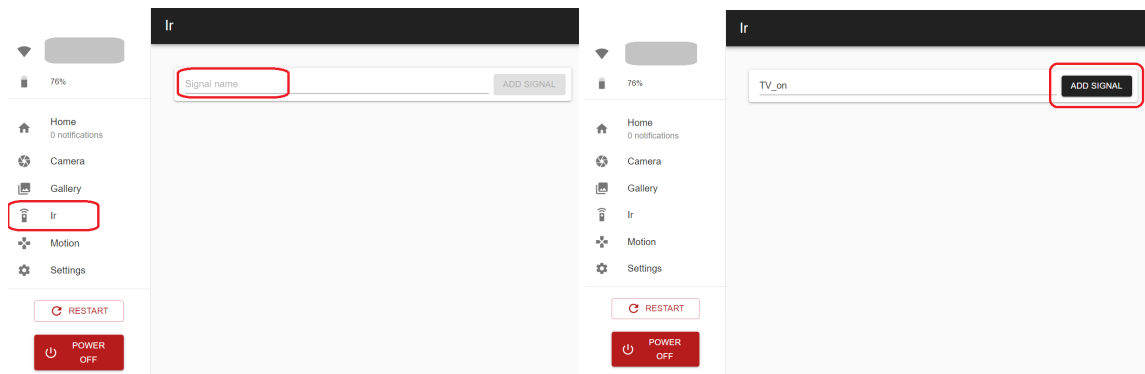
<Recording new IR signals>

1. The open hold on the right side of the PLEN Cube’s top layer is where the IR signal receiver is located.



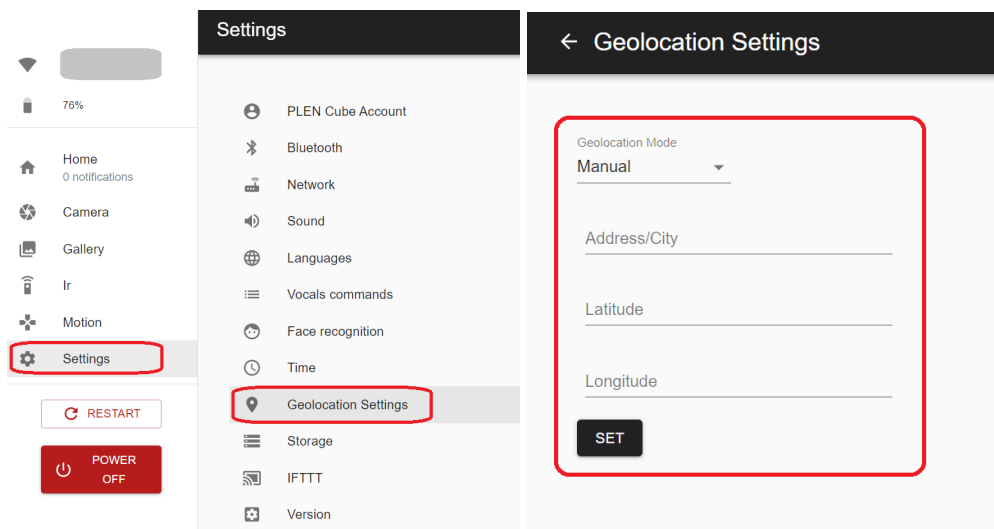
2. In the PLEN Cube web application, open the “Infrared” from the menu panel, choose a command to record a signal from the drop down menu, and select “Record Signal.” The PLEN Cube will immediately start recording any infrared signal entering the receiver sensor. Push the desired button on the remote control to record that IR signal to the PLEN Cube while pointing the sending LED of the controller at the hole on the right side of the PLEN Cube (with the IR receiver).





【 Weather Report Setup 】

In order to have the PLEN Cube give accurate weather reports, the PLEN Cube's current location must be setup. In the PLEN Cube web application menu, select “Set Location,” input the required information into the bars and select “set” at the bottom.

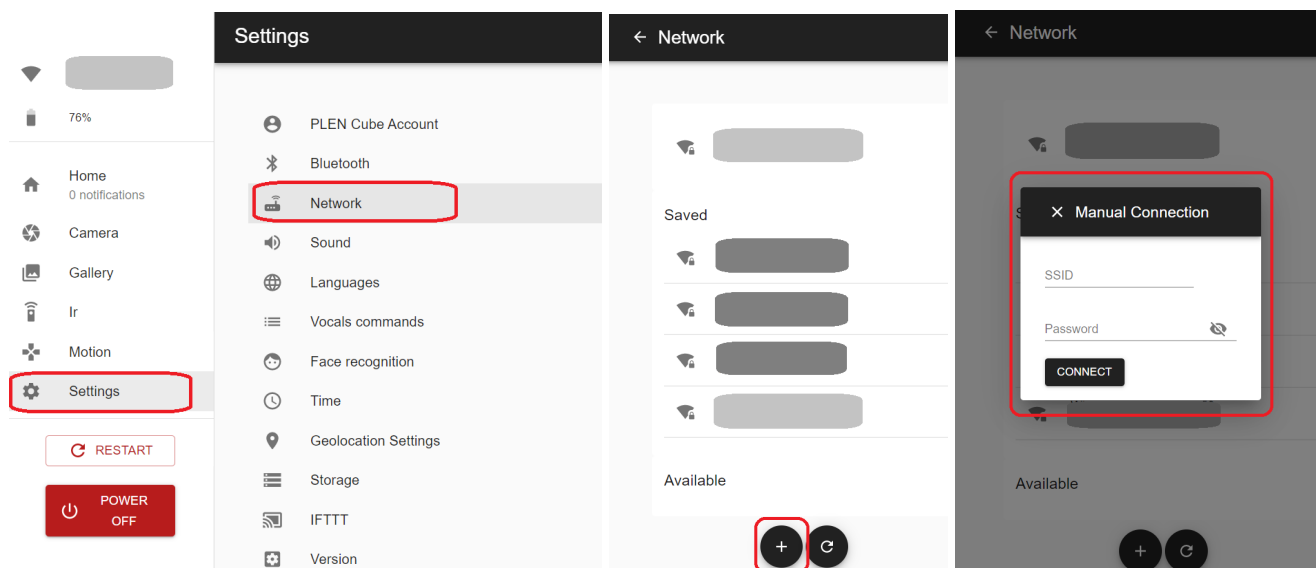


【 Connecting to a new network 】

Follow this procedure to input and connect to a new network that is different from the initial network introduced during first use of the PLEN Cube.



Choose the “Settings” option in the web application menu and select “Network settings”. Click on the “+” icon at the bottom of the screen to add a new network manually. Enter the SSID and password of the desired new network. Ensure this new network is running and available, and ensure that the PLEN Cube is in a location to receive a strong signal from the new network.



After the new network has been entered and the “Connect” button pressed, the PLEN Cube will speak out the name of the new network it has connected to if the connection was successful. Now that the PLEN Cube is connected to a new network, the web application will no longer update nor be able to control the PLEN Cube. The PC or smart device must also change its connected network to the new network with the PLEN Cube.

※ If the PLEN Cube speaks out “Hotspot” instead of the new network name, the connection has failed. Please ensure that the desired new network is running and available, that the SSID and password information are correct, or that the signal is strong enough for the PLEN Cube to receive, and then restart this “Connecting to a new network” process.

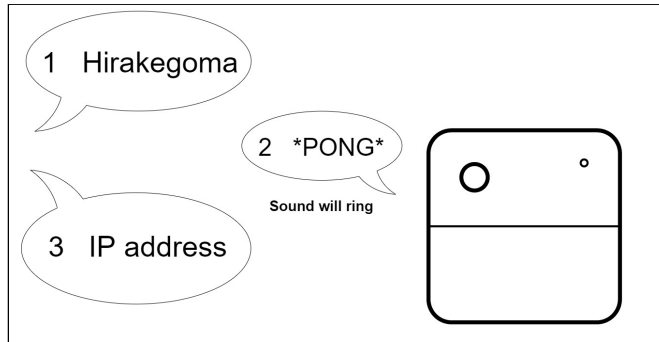
※ It will not be possible to connect the PLEN Cube to networks with 2-step verification that may be used in certain companies, schools, or other protected organizations.

When the new network connection is successful and the PLEN Cube speaks the new network name, it will also speak the new IP address for the web application access. Please take note of this new IP address.

In the event the spoken IP address was lost or misunderstood, the IP address can be retrieved by two ways:

1. Turn off the PLEN Cube by pressing and holding the power switch for 5 full seconds and then turn the PLEN Cube back on by holding the power switch for 3 full seconds. During this new start-up, the PLEN Cube will again voice the network name and IP address to which it is currently connected. It is important to take note of this voiced network and IP address to connect to the PLEN Cube.
2. Speak the trigger word “**Hirakegoma**” to the PLEN Cube in a slow and clear voice and wait for the PLEN Cube to finish moving and ring the “pong” sound. Speak in a slow and clear voice “**IP address.**” The PLEN Cube will then nod and speak its current IP address





※ Note that the spoken IP address may be the address of the PLEN Cube hotspot or of another network that the PLEN Cube has previously successfully connected to if the new network is not available.

After switching the smart device or PC to the new network, open a new web browser and input the new IP address that the PLEN Cube has spoken into the search bar to access the web application.

【 Current Time Setup】

The PLEN Cube will automatically adjust its current time when it has successfully connected to a network with internet.

【 Updating Software and Firmware 】

Updates will be available regularly for the PLEN Cube and will be downloaded and updated automatically. Updates will take some time, please do not turn off the PLEN Cube while it is updating.



【 Troubleshooting 】

1. The PLEN Cube does not respond to the trigger word

- Ensure the environmental background noise is not too loud. If it is equally as loud as the spoken trigger word, the PLEN Cube will not recognize it.
- Confirm if there is a “pong” sound ringing from the speaker after the trigger word is said. If there is a “pong” sound, please refer to the “2. The head will not move or rotate” troubleshooting.

2. The head will not move or rotate

- The battery is low. Please connect the PLEN Cube charger and try again.
- Check the status light at the back of the PLEN Cube beside the power switch. If the light is flashing red, something has interfered with the head rotation and it has been locked. Press the power switch **twice** (for 1 second or less) and the head will become unlocked.
- In the case that the head does not become unlocked after following the above procedure, or the situation is outside of one of the above conditions, please restart the PLEN Cube by pressing and holding the power switch for 5 full seconds and then turn the PLEN Cube back on by holding the power switch for 3 full seconds.

3. The PLEN Cube does not turn on when the power switch is held for 3 seconds

- Confirm if the green LED at the back of the PLEN Cube beside the power switch is on. If so, confirm if the speaker is used by the PLEN Cube during the next 60 seconds of start up. If the speaker is heard, please see “2. The head will not move or rotate” troubleshooting.
- Please connect the PLEN Cube charger and wait approximately 5 minutes then try the power switch again while the PLEN Cube charger is still connected.
- If none of the above conditions solve the issue, please contact PLEN Robotics Inc. for guidance.

4. The PLEN Cube will not charge

- Plug in the provided charger into the PLEN Cube and an electrical outlet. If the red status LED beside the power switch turns on solid, the PLEN Cube is currently charging. Please wait approximately 5 minutes before attempting to turn on the PLEN Cube if the battery has been completely used up. If the red status LED does not turn on, the battery may already be 100% charged.
- Check if there is any dust or obstructions in the micro-B USB terminal in the PLEN Cube and remove it. Plug in the charger and try again.
- If the red status LED beside the power switch is flashing while the provided PLEN Cube charger is connected to the terminal and an electrical outlet, a charging error has occurred. Please do not use the PLEN Cube and contact PLEN Robotics Inc. for guidance.

5. The web application display will not update

- Try reloading the browser.
- Try accessing the PLEN Cube application with a different browser (Google Chrome recommended).



If the troubleshooting recommendations above do not solve the issue, or if a different issue not listed above is discovered, please contact PLEN Robotics support at:

support-plencube@plenrobotics.com



【Specifications】

Product Name	PLEN Cube PC020B
Dimensions	apprx. 74 x 74 x 74mm
Weight	Battery Included model: apprx.320g
Head motion range	Pitch/Roll:±15° Yaw:350° Up-Down: 10mm
Display	320 x 240 pixels(PC020DB only)
Camera	Full HD
Microphone	4 microphones (MEMS)
Sensors	Motion sensor(pyroelectric)
Wi-Fi	IEEE802.11 b/g/n
Bluetooth	4.2
Infrared Sensor	LED signal: 3 (left, right, and back faces) Receiver: 1(right face)
Battery Capacity (Battery Model Only)	3450mAh
Charging time (Battery Model Only)	apprx. 2 hrs (dependant on product use)
Operating time (Battery Model Only)	Waiting : apprx 3 hrs(varies depending on use) Constant video streaming : apprx. 1 hr (varies depending on use)
Main Functions	Photos / videos / panoramas / live video streaming / voice control / internet connection and services / IR appliance control / Bluetooth connection / face recognition / Real time face tracking



【 Warranty 】

Should the product experience failure or malfunction from normal use while the user has followed the instruction manual and has not forcibly interfered or opened the product, repair or replacement will be performed free of charge for 90 days from when the product arrives. When requesting repairs within the warranty period, confirm the date of purchase and contact the PLEN Robotics support at **support-plencube@plenrobotics.com**. This warranty will not be reissued.

Product name	PLEN Cube PC020B
Warranty time frame	Up to 90 days after purchase
Customer Name	
Customer Address	
Date of product purchase	

Repairs may be charged even within the warranty period in the following cases:

1. This warranty is not presented.
2. Malfunction or damage has been incurred due to improper use or improper repair or modification by the user contrary to the explanation and caution of the manual.
3. Damage has been incurred due to dropping, getting wet, or other pre-cautioned effects after purchase.
4. Damage has been incurred due to uncontrollable natural disasters such as fire, earthquake, storm and flood damage, lightning strike, salt damage, gas damage, or damage due to experiencing abnormal power inputs
5. The battery has been replaced by a party not authorized by PLEN Robotics Inc.

※ This warranty is only valid in Japan.

※ Repairs will not be conducted while on business trips.

※ Customers will be responsible for repair shipping costs that are outside this warranty. PLEN Robotics will be responsible for shipping fees should there be failure within one week after the product arrives.



CE statements:

CAUTION RISK OF EXPLOSION IF BATTERY IS REPLACED
BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES
ACCORDING TO THE INSTRUCTIONS.

Do not use the device in the environment at too high or too low temperature,
never expose the device under strong sunshine or too wet environment.

The suitable temperature for the product and accessories is 0°C-40°C.

When charging, please place the device in an environment that has a normal room
temperature and good ventilation. It is recommended to charge the device in an environment
with a temperature that ranges from 0°C~40°C. Please ensure to use only the charger offered
by the manufacturer. Using unauthorized charger may cause danger and violate the authorization
of the phone and the guarantee article.

The charger type is ATS018T-W050V, output voltage/current is 5V DC/3A. The plug considered as disconnect
device of adapter.

The SAR limit of Europe is 2.0 W/kg. Device types PLEN Cube PC020B has also been tested against this SAR
limit. The highest SAR value reported under this standard during product certification for use on the body is
0.038 W/kg. This device was tested for typical body-worn operations kept 0.5cm from the body. To maintain
compliance with RF exposure requirements, use accessories that maintain a 0.5cm separation distance between
the user's body . The use of belt clips, holsters and similar accessories should not contain metallic components
in its assembly. The use of accessories that do not satisfy these requirements may not comply with RF exposure
requirements, and should be avoided.

Frequency range

Operating Frequency Range, Max EIRP

2.4GHz WiFi: 2412MHz ~ 2472MHz, 16.76dBm

Bluetooth: 2402MHz ~ 2480MHz, 7.21dBm

Manufacturer

Manufacturer: PLEN Robotics Inc.

Address: Crepis21 303,4-6-3,Toyosaki,Kita-Ku,Osaka-shi,Osaka,Japan



This product can be used across EU member states.

EU Regulatory Conformance

Hereby, PLEN Robotics Inc. declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

For the declaration of conformity, visit the Web site

https://plenrobotics.com/pc020b_ce_fcc.pdf



FCC statements:

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications or changes to this equipment. Such modifications or changes could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The SAR limit of USA (FCC) is 1.6 W/kg averaged over one gram of tissue. Device types PLEN Cube PC020B (FCC ID: 2AWGK-PC020BD) has also been tested against this SAR limit. The highest SAR value reported under this standard during product certification for use when properly worn on the body is 0.532 W/kg. This device was tested for typical body worn operations kept 5mm from the body. To maintain compliance with FCC RF exposure requirements, use accessories that maintain a 5mm separation distance between the user's body and the back of the handset. The use of belt clips, holsters and similar accessories should not contain metallic components in its assembly. The use of accessories that do not satisfy these requirements may not comply with FCC RF exposure requirements, and should be avoided.



PLEN Cube 取扱説明書

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