

Pico Next Gateway User Guide



Revision History

Revision	Date	Description
.001	Aug. 19, 2021	Browan first release
.002	Feb. 15, 2022	Add Regulatory and change LED function
.003	Apr. 28, 2022	Add WiFi Station configuration
.004	Aug. 5, 2022	Add Packet Forwarder Whitelist Filter, OpenVPN Client configuration, and Professional Installation instructions
.005	Oct. 6, 2022	Add firmware upgrade details. Update Whitelist Filter and Channel Scan
.006	Oct. 31, 2022	Add passive PoE data
.007	Jan. 13, 2023	Add Auto OTA update, file export, PLMN ID for LTE, and packet forwarder restore to default
.008	Nov. 17, 2023	Add LoRa Packet Buffer description Add Keep Alive Update Basic Station sections Add Packet Forwarder with Embedded LNS Add ABP sections Add Network Server and integration Add Connection Check Address



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Regulatory

Federal Communication Commission Statement (FCC, U.S.)

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 an 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 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.

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.

Radiation Exposure Statement

This device complies with RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
This device must operate with a minimum distance of 20 cm between the radiator and user body.

FCC Caution:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.



IC WARNING

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Radiation Exposure Statement:

This equipment complies with Canada radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corp.



Professional Installation Instructions

1. Installation personal

This product is designed for specific applications and needs to be installed by a qualified person who has RF and related rules knowledge. The general user shall not attempt to install or change the settings.

2. Installation location

The product shall be installed at a location where the radiating antenna can be kept 20 cm from nearby persons in normal operation conditions to meet regulatory RF exposure requirements.

3. External antenna

Use only the antennas that have been approved by the applicant. Non-approved antenna(s) may produce unwanted spurious or excessive RF transmitting power, which may lead to the violation of FCC/IC limits and is prohibited.

4. Installation procedure

Please refer to user's manual for details.

5. Warning

Please carefully select the installation position and make sure that the final output power does not exceed the limits set forth in relevant rules. Violation of the rules could lead to serious federal penalties.



Instructions d'installation professionnelle

1. Installation

Ce produit est destiné à un usage spécifique et doit être installé par un personnel qualifié maîtrisant les radiofréquences et les règles s'y rapportant. L'installation et les réglages ne doivent pas être modifiés par l'utilisateur final.

2. Emplacement d'installation

En usage normal, afin de respecter les exigences réglementaires concernant l'exposition aux radiofréquences, ce produit doit être installé de façon à respecter une distance de 20 cm entre l'antenne émettrice et les personnes.

3. Antenne externe.

Utiliser uniquement les antennes approuvées par le fabricant. L'utilisation d'autres antennes peut conduire à un niveau de rayonnement essentiel ou non essentiel dépassant les niveaux limites définis par FCC/IC, ce qui est interdit.

4. Procédure d'installation

Consulter le manuel d'utilisation.

5. Avertissement

Choisir avec soin la position d'installation et s'assurer que la puissance de sortie ne dépasse pas les limites en vigueur. La violation de cette règle peut conduire à de sérieuses pénalités fédérales.

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1 Product Overview

1.1 Product Features

The Pico Next Gateway is a LoRa gateway with GPS, using numerous ways of connection: ethernet, LTE, and Wi-Fi. Depending upon the SKU, some functions might not be available. Pico Next is specifically designed for wide-area IoT applications. Applications include, but are not limited to, home security, automatic meter-reading, monitoring fault-indicators, and monitoring streetlights. This gateway is very suitable for small businesses or private area uses like at parking lots, exhibition centers, and campuses.

1.2 LED Functions

LED Functions	Constant	Flashing	Off
Power	Power On	Booting /OTA	OFF
Internet	Internet Available	Checking Internet	RFU
Service	LNS Connected	RFU	LNS Not Connected
LoRa	LoRa Working	Initializing	LoRa Not Working

1.3 Reset Button

Reboot:

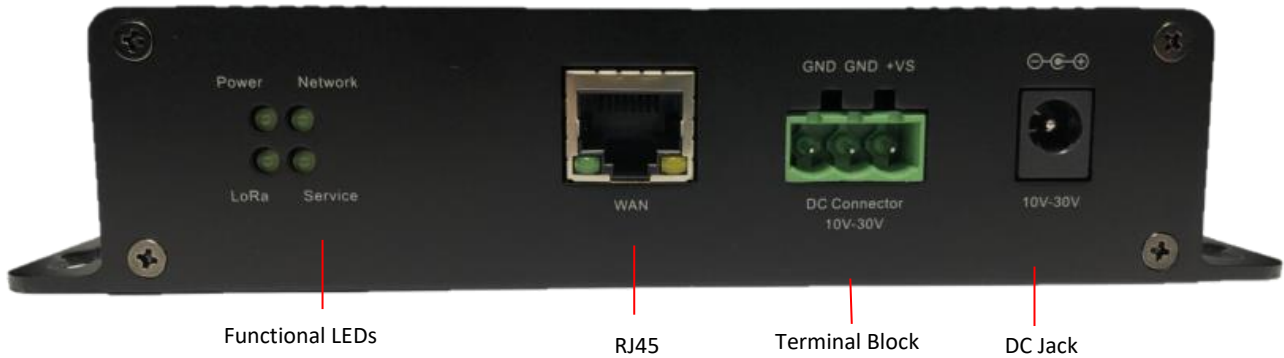
By pressing and holding the RESET Button, the Power LED will start flashing. The “reboot” procedure will be triggered when the RESET Button is released while the Power LED light is flashing.

Restore to Default:

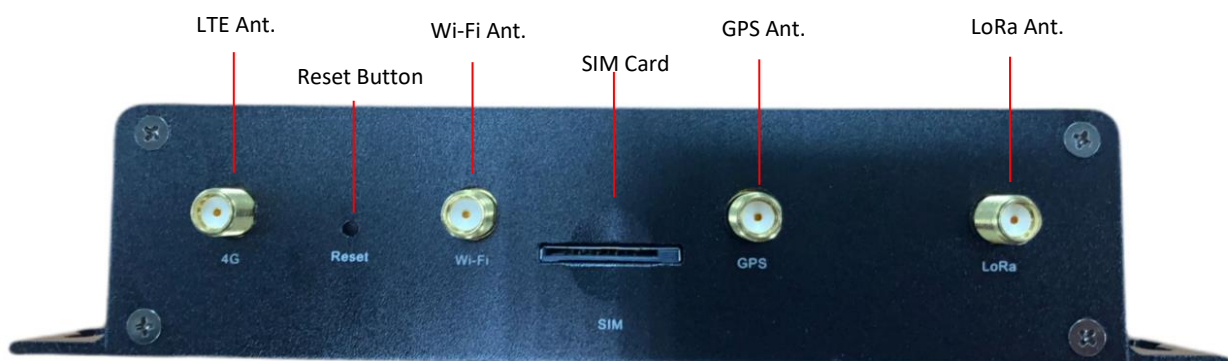
By pressing and holding the RESET Button, the Power LED will start flashing. The “restore to default” procedure will be triggered when the RESET Button released after the Power LED light becomes constant.

1.4 I/O Ports

Front Panel -



Back Panel -



1.5 Accessories

Different SKUs would provide accessories pertaining to that country or SKU, such as the adapter plug model and GPS antenna. LTE and Wireless antennas are interchangeable; they have the same specifications.

*Please note that the GPS antenna needs to be purchased separately. *

Adapter



LoRa Antenna



LTE and Wi-Fi Antenna



GPS Antenna *



2 Installation

2.1 Power up

Power up Pico Next through the following ways.

2.1.1 DC Adapter

Connect the power adapter provided to the DC jack In. Pico Next will automatically turn on after powering up.

2.1.2 Terminal Block

Connect a power supply to Pico Next with a 3-pin pluggable male terminal block.

2.1.3 Ethernet

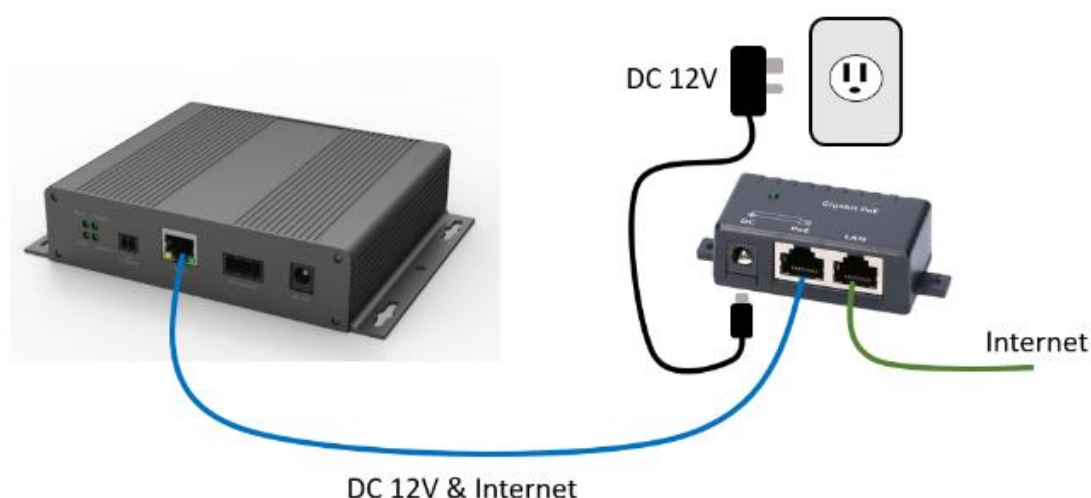
Connect a RJ45 Ethernet cable to Power-over-Ethernet in (WAN port). Connect the other end of the ethernet cable to a passive PoE that ensures a power of 12V / 1.5A DC. Provide power to the passive PoE.

2.1.3.1 Passive PoE

Passive PoE, passive Power over Ethernet, is a non-standard PoE. It can deliver power over the Ethernet lines, but without the negotiation or communication process; the power is “always-on”. It requires using passive PoE injectors for networks, which send electric current out over the Ethernet cable at a certain voltage.

Pins at RJ45 Connector	Passive PoE (DC on Spares)
Pin 1	Rx+
Pin 2	Rx-
Pin 3	Tx+
Pin 4	DC +9V~+30V
Pin 5	DC +9V~+30V
Pin 6	Tx-
Pin 7	Ground
Pin 8	Ground

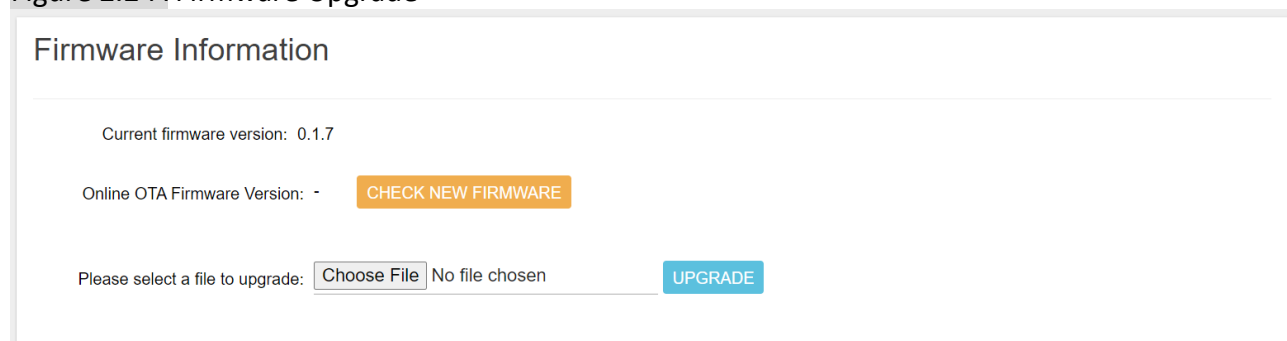
In general, a Passive PoE Injector has three connectors: DC jack, RJ45 for PoE and RJ45 for LAN. Simply connect a power source (output range of power adapter must be between 10V~30V) to the DC jack on the injector and the LED indicator will turn on. Then, use an ethernet cable to connect the LAN port on injector to your network, and use another ethernet cable to connect the PoE port on injector to your PicoNext Gateway.



2.2 Upgrade Firmware

Upgrade to the newest firmware with Web GUI following below “**3.1 Open Admin GUI**” page 13 instructions and upgrading with “**4.3 System Firmware**” page 15 instructions. By clicking the “Check New Firmware” button, the gateway may upgrade to the latest firmware version.

Figure 2.2-A Firmware Upgrade



Firmware Information

Current firmware version: 0.1.7

Online OTA Firmware Version: - **CHECK NEW FIRMWARE**

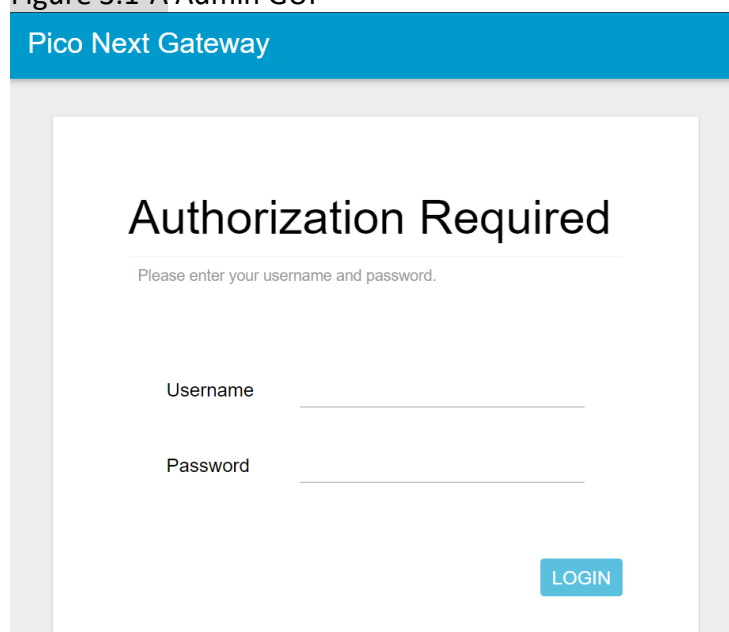
Please select a file to upgrade: No file chosen **UPGRADE**

3 GUI Access

3.1 Open Admin GUI

Default mode of Pico Next Gateway is DHCP. Once Pico Next is turned on through plugging in the DC adapter, it will automatically link to available servers. Pico Next’s IP address can be found from the DHCP server. Access Pico Next WebUI via the DHCP IP on Chrome. The default username is “**admin**”, and the password can be found on the back label.

Figure 3.1-A Admin GUI



Pico Next Gateway

Authorization Required

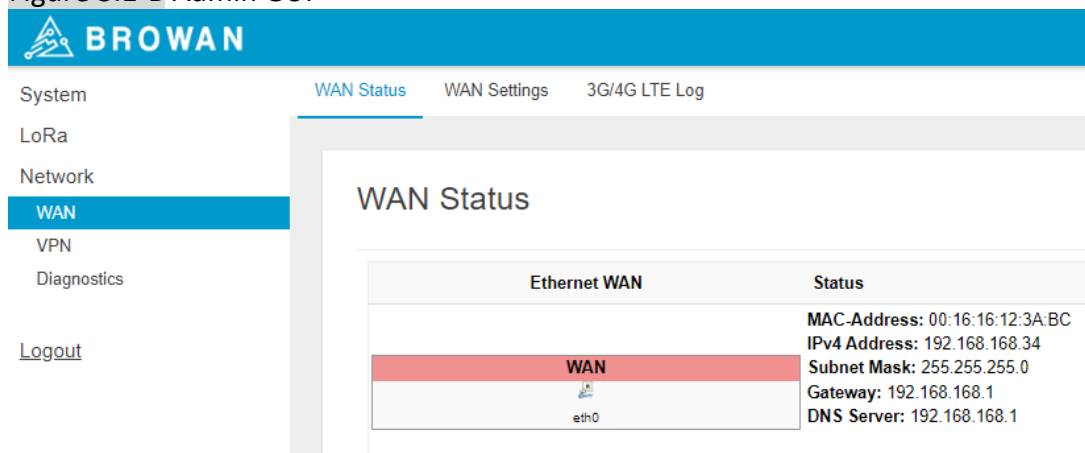
Please enter your username and password.

Username

Password

LOGIN

Figure 3.1-B Admin GUI



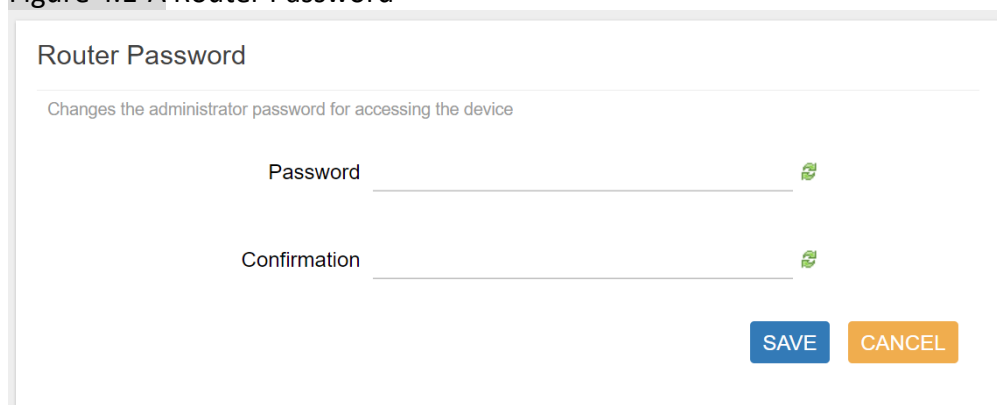
4 System

The System menu consists of the following categories: **Administration**, **Restore**, **System Firmware** and **Support**. An introduction of each category will be distinctly stated in individual paragraphs.

4.1 Administration

Pico Next GUI login password can be configured on this page.

Figure 4.1-A Router Password



Router Password

Changes the administrator password for accessing the device

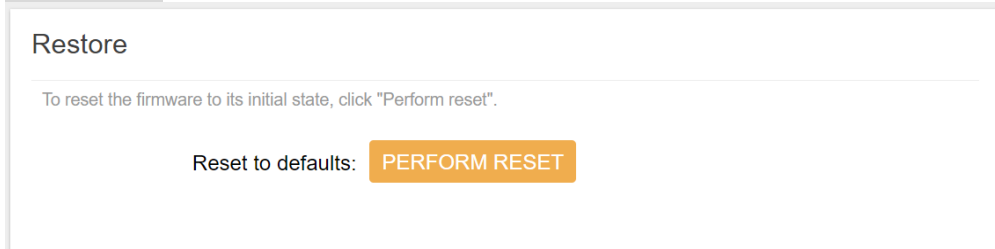
Password

Confirmation

SAVE CANCEL

4.2 Restore

Restore the **Password Credential**, **LoRa Setting** and **Network Setting** to the default configurations.

Figure 4.2-A Restore

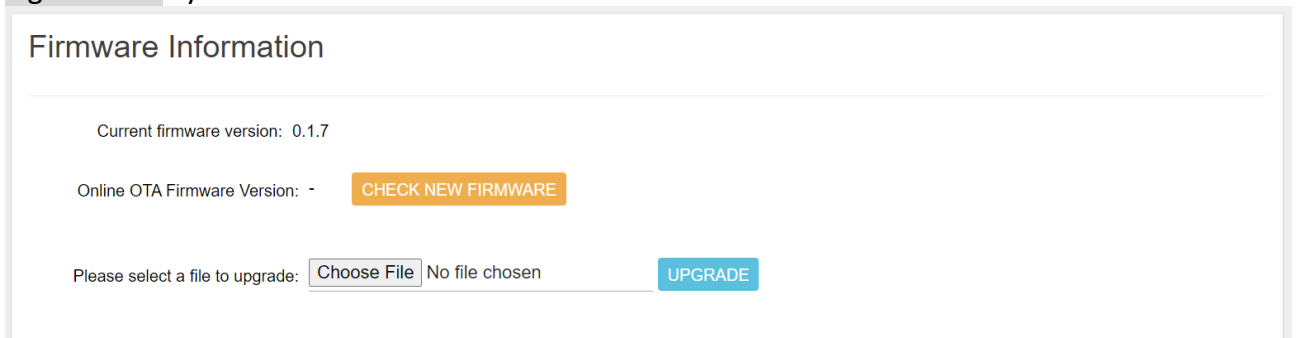
Restore

To reset the firmware to its initial state, click "Perform reset".

Reset to defaults: **PERFORM RESET**

4.3 System Firmware

Here the current firmware version can be found. Click the "Choose File" button to upload the newest system firmware. Click the "UPGRADE" button to upgrade the system firmware.

Figure 4.3-A System Firmware

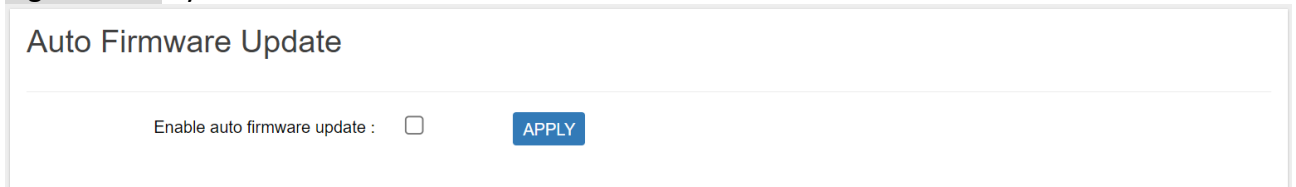
Firmware Information

Current firmware version: 0.1.7

Online OTA Firmware Version: - **CHECK NEW FIRMWARE**

Please select a file to upgrade: **Choose File** No file chosen **UPGRADE**

The Auto Firmware Update can be enabled, and the device will check the OTA server for new firmware versions daily.

Figure 4.3-B System Firmware

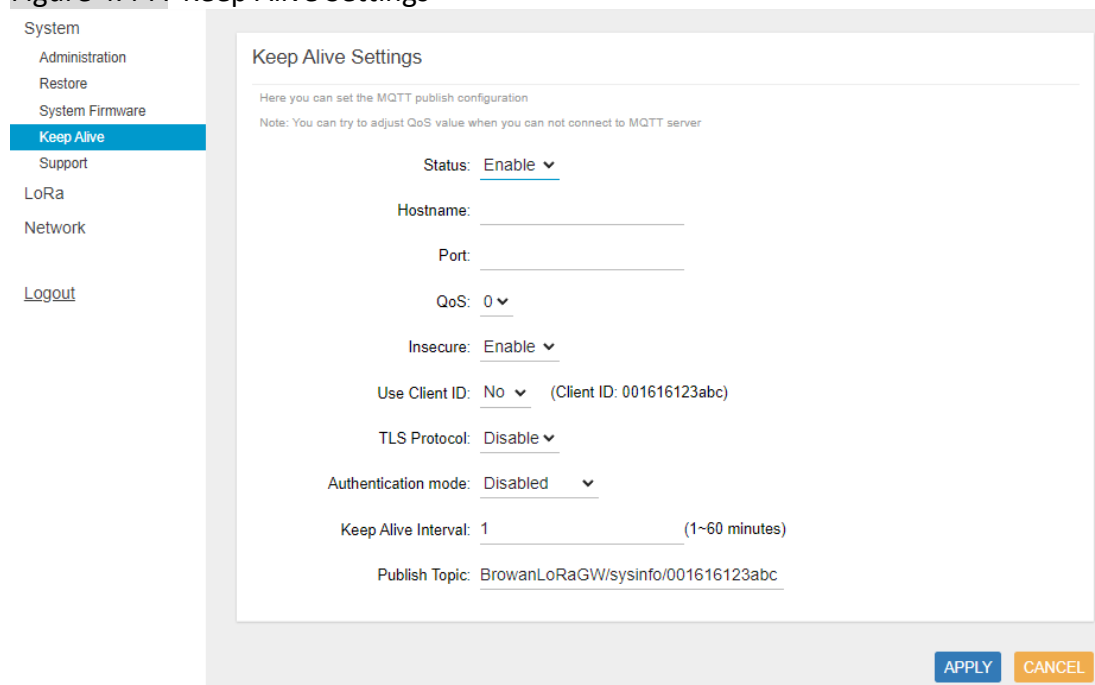
Auto Firmware Update

Enable auto firmware update : ☐ **APPLY**

4.4 Keep Alive

By enabling **Keep Alive**, *PicoNext* will periodically publish the Gateway status to the defined MQTT broker server with insecure or secure methods.

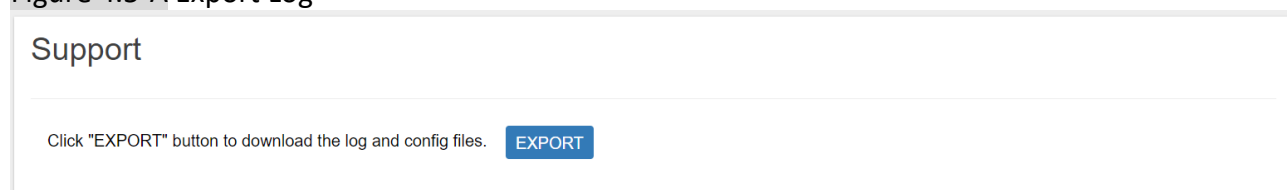
Figure 4.4-A Keep Alive Settings



4.5 Support

Click the “**EXPORT**” button to download the log and config files.

Figure 4.5-A Export Log



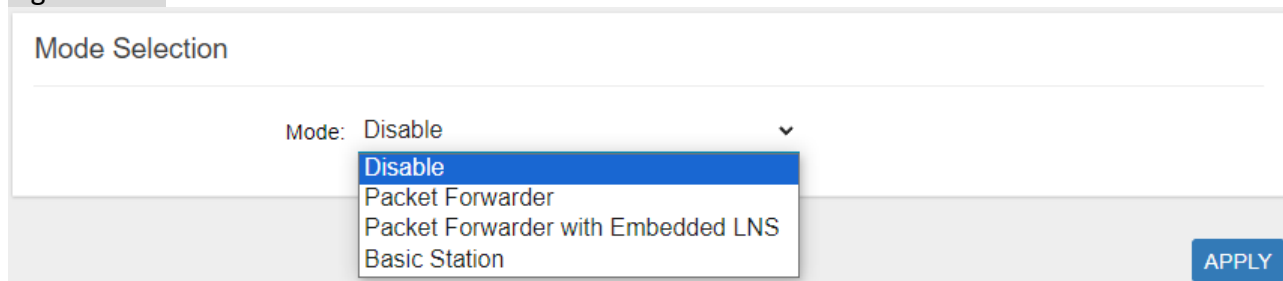
5 LoRa Settings

The LoRa menu consists of the following categories: **Mode Selection**, **Channel Scan** and **Log**. An introduction of each category will be distinctly stated in individual paragraphs.

5.1 Mode Selection

By default, the LoRa Mode is disabled. Configure the “**Packet Forwarder**” or “**Basic Station**” by using the dropdown list.

Figure 5.1-A LoRa Mode Selection



Mode Selection

Mode: Disable

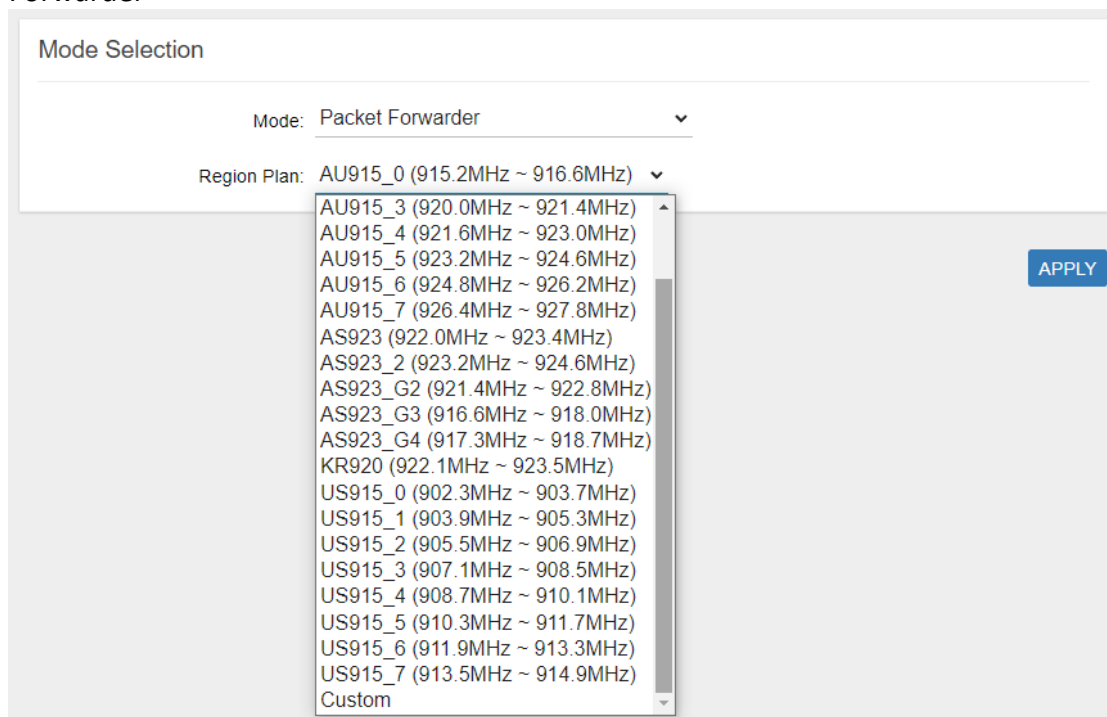
- Disable
- Packet Forwarder
- Packet Forwarder with Embedded LNS
- Basic Station

APPLY

5.1.1 Packet Forwarder

Choose the "**Packet Forwarder**" option and click the "**APPLY**" button to Enable the Packet Forwarder mode. After applying the setting, the "Packet Forwarder" field can be found on the left menu.

Figure 5.1.1-A LoRa Mode Selection with pre-defined Region Plan or Customization - Packet Forwarder



Mode Selection


Mode: Packet Forwarder

Region Plan: AU915_0 (915.2MHz ~ 916.6MHz)

- AU915_3 (920.0MHz ~ 921.4MHz)
- AU915_4 (921.6MHz ~ 923.0MHz)
- AU915_5 (923.2MHz ~ 924.6MHz)
- AU915_6 (924.8MHz ~ 926.2MHz)
- AU915_7 (926.4MHz ~ 927.8MHz)
- AS923 (922.0MHz ~ 923.4MHz)
- AS923_2 (923.2MHz ~ 924.6MHz)
- AS923_G2 (921.4MHz ~ 922.8MHz)
- AS923_G3 (916.6MHz ~ 918.0MHz)
- AS923_G4 (917.3MHz ~ 918.7MHz)
- KR920 (922.1MHz ~ 923.5MHz)
- US915_0 (902.3MHz ~ 903.7MHz)
- US915_1 (903.9MHz ~ 905.3MHz)
- US915_2 (905.5MHz ~ 906.9MHz)
- US915_3 (907.1MHz ~ 908.5MHz)
- US915_4 (908.7MHz ~ 910.1MHz)
- US915_5 (910.3MHz ~ 911.7MHz)
- US915_6 (911.9MHz ~ 913.3MHz)
- US915_7 (913.5MHz ~ 914.9MHz)
- Custom

APPLY

Figure 5.1.1-B LoRa Mode Selection - Packet Forwarder

 Applying settings...

Mode Selection

Mode: Packet Forwarder

Region Plan: AU915_1 (916.8MHz ~ 918.2MHz)

APPLY

Figure 5.1.1-C LoRa Settings - Packet Forwarder menu

System
Gateway Info
Gain
Radio and Channel Settings

LoRa
Mode Selection
Packet Forwarder
Packet Buffering
Whitelist Filter
Config Restore
Logs
Network
Logout

Gateway Info

Gateway ID: 0016C001FF17DA39

Server Address: localhost

Server Uplink Port: 1680 (1~65535)

Server Downlink Port: 1680 (1~65535)

5.1.1.1 Gateway Info

This page is for setting up the LoRa configuration including **Gateway ID**, **Server Address**, **Server Uplink Port**, **Server Downlink Port**, **Keep-Alive Interval**, **Statistics Display Interval**, and **Push Timeout**.

Figure 5.1.1.1-A Gateway Info

Gateway Info

Gateway ID: 1c497bfffefb5e56

Server Address: browan.eu1.cloud.thethings

Server Uplink Port: 1700 (1~65535)

Server Downlink Port: 1700 (1~65535)

Keep Alive Interval: 10 (seconds)

Statistics display Interval: 30 (seconds)

Push Timeout: 100 (milliseconds)

5.1.1.2 Antenna Gain

This page is for setting up the *antenna gain* of Lora.

Figure 5.1.1.2-A Antenna Gain

Antenna Gain: (0 ~ 15)

APPLY

5.1.1.3 Radio and Channel Settings

This page is for configuring the radio 0 and radio 1 configurations of Lora, including **Central Frequency**, **Channel Status**, and **Center frequency offset**.

Figure 5.1.1.3-A Radio and Channel Settings

Radio Settings

Here you can modify Central frequency of Radio 0 or Radio 1 to change channel frequencies.

Radio 0	Radio 1
Central Frequency: <input type="text" value="867400000"/> (Hz)	Central Frequency: <input type="text" value="868200000"/> (Hz)
RSSI Offset: <input type="text" value="-167"/> (dBm)	RSSI Offset: <input type="text" value="-167"/> (dBm)

Channel Assignment

CH 0 Status: <input type="text" value="Enable"/>	Radio Interface: <input type="text" value="0"/>	CenterFreqOffset: <input type="text" value="-300000"/> (-400000~+400000)
CH 1 Status: <input type="text" value="Enable"/>	Radio Interface: <input type="text" value="0"/>	CenterFreqOffset: <input type="text" value="-100000"/> (-400000~+400000)
CH 2 Status: <input type="text" value="Enable"/>	Radio Interface: <input type="text" value="0"/>	CenterFreqOffset: <input type="text" value="100000"/> (-400000~+400000)
CH 3 Status: <input type="text" value="Enable"/>	Radio Interface: <input type="text" value="0"/>	CenterFreqOffset: <input type="text" value="300000"/> (-400000~+400000)
CH 4 Status: <input type="text" value="Enable"/>	Radio Interface: <input type="text" value="1"/>	CenterFreqOffset: <input type="text" value="-300000"/> (-400000~+400000)
CH 5 Status: <input type="text" value="Enable"/>	Radio Interface: <input type="text" value="1"/>	CenterFreqOffset: <input type="text" value="-100000"/> (-400000~+400000)
CH 6 Status: <input type="text" value="Enable"/>	Radio Interface: <input type="text" value="1"/>	CenterFreqOffset: <input type="text" value="100000"/> (-400000~+400000)
CH 7 Status: <input type="text" value="Enable"/>	Radio Interface: <input type="text" value="1"/>	CenterFreqOffset: <input type="text" value="300000"/> (-400000~+400000)
CH 8 Status: <input type="text" value="Enable"/>	Radio Interface: <input type="text" value="1"/>	CenterFreqOffset: <input type="text" value="100000"/> (-375000~+375000)

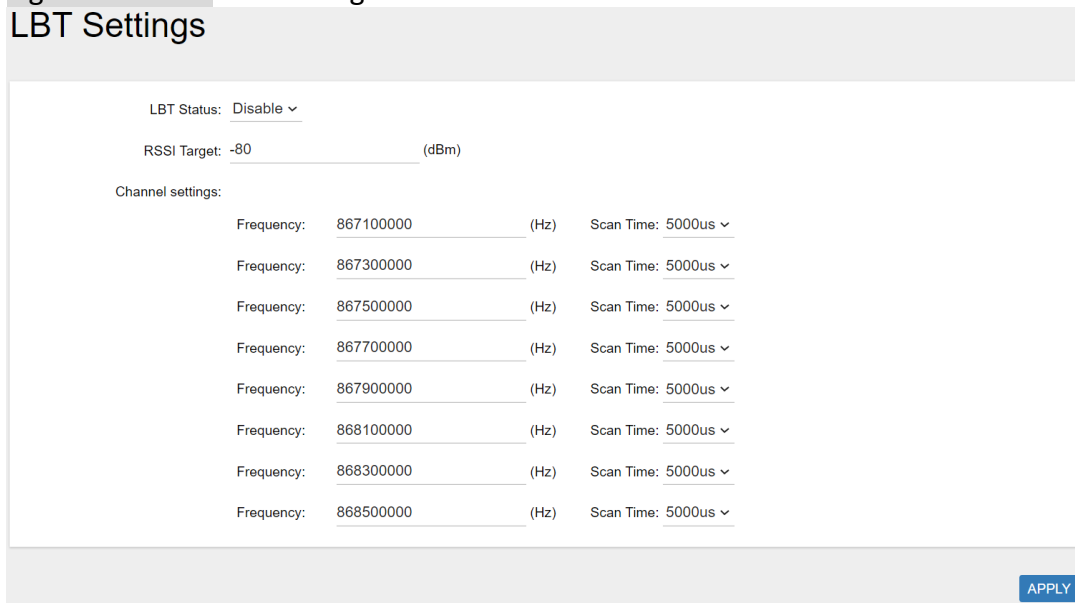
Channel Bandwidth:

APPLY

5.1.1.4 LBT Settings

For some regions (i.e. Japan), the Listen Before Talk (LBT) function is a must. This page is for setting up the LBT configuration of Lora, including **LBT Status**, **RSSI Target**, **Channel settings**. However, LBT is only available on specific HW SKUs. Please check with your contact window.

Figure 5.1.1.4-A LBT Settings
LBT Settings



LBT Status: Disable ▾

RSSI Target: -80 (dBm)

Channel settings:

Frequency:	867100000	(Hz)	Scan Time: 5000us ▾
Frequency:	867300000	(Hz)	Scan Time: 5000us ▾
Frequency:	867500000	(Hz)	Scan Time: 5000us ▾
Frequency:	867700000	(Hz)	Scan Time: 5000us ▾
Frequency:	867900000	(Hz)	Scan Time: 5000us ▾
Frequency:	868100000	(Hz)	Scan Time: 5000us ▾
Frequency:	868300000	(Hz)	Scan Time: 5000us ▾
Frequency:	868500000	(Hz)	Scan Time: 5000us ▾

APPLY

5.1.2 Whitelist Filter

To reduce unnecessary data traffic, this page configures the whitelist filter for the Packet Forwarder through **Fport Filter** and **DevAddr Filter**.

If the “FPort” or the “DevAddr” of an end-device matches with the information on the whitelist, the lora package will then be forwarded to the network server. On the other hand, Join-Request packages are always allowed to be forwarded to the network server.

FPort:

The filter port range is from 1 to 223. Fill in with “-1” if Fport checking is not needed.

DevAddr:

If the end-device is activated by OTAA, the DevAddr can usually be found on the network server. Each DevAddr (4 bytes) can be split into 64 bits. Every 4 bits form a group which is called “NABBLE”. The DevAddr filter will check each “NABBLE” individually. Fill in with the alphabet “X” if DevAddr checking is not needed.



Figure 5.1.2-A Whitelist Filter

Whitelist Filter

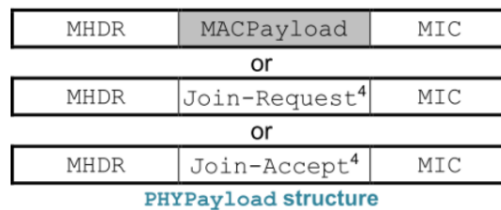
Enable <input checked="" type="checkbox"/>	Fport Filter	-1	(-1 or 1~223)	DevAddr Filter	27XXXXXX
Enable <input checked="" type="checkbox"/>	Fport Filter	100	(-1 or 1~223)	DevAddr Filter	48009527
Enable <input checked="" type="checkbox"/>	Fport Filter	136	(-1 or 1~223)	DevAddr Filter	XXXXXXXX

Note:

1. The value in "DevAddr Filter" should be a Hex format (but allow X).
2. X is for don't care bit, for example, if you want to filter all devices end with AABBCCD, you can set it with XAABBCCD in DevAddr Filter.

Figure 5.1.2-B LoRaWAN frame format elements

PHYPayload:



MACPayload:



FHDR:



5.1.2.1 Examples of Whitelist Filter

Case 1:

Only forward messages from Fport=120 to the network server. DevAddr is not checked in this case.

Figure 5.1.2.1-A Whitelist Filter Case 1

Enable <input checked="" type="checkbox"/>	Fport Filter	120	(-1 or 1~223)	DevAddr Filter	XXXXXXXX
Enable <input type="checkbox"/>	Fport Filter	0	(-1 or 1~223)	DevAddr Filter	XXXXXXXX
Enable <input type="checkbox"/>	Fport Filter	0	(-1 or 1~223)	DevAddr Filter	XXXXXXXX

Figure 5.1.2.1-B Network Server Case 1

Gateways > pico-5813D3FFFE2984D2 > Live data									
Time	Type	Data preview					Verbose stream	Export as JSON	Pause
↑ 13:56:21	Receive uplink message	DevAddr:	88 88 88 88	<>	FCnt:	1	FPort:	120	Data rate: SF7BW125 SNR: 9.3 RSSI: -83
↑ 13:56:15	Receive uplink message	JoinEUI:	00 16 16 00 00 00 02	<>	DevEUI:	00 16 16 00 00 00 24 5A	<>		Data rate: SF7BW125 SNR: 10 RSSI: -97
↑ 13:56:13	Receive uplink message	DevAddr:	99 99 99 99	<>	FCnt:	3	FPort:	120	Data rate: SF7BW125 SNR: 9 RSSI: -80
↑ 13:56:01	Receive uplink message	JoinEUI:	00 16 16 00 00 00 02	<>	DevEUI:	00 16 16 00 00 00 24 5A	<>		Data rate: SF7BW125 SNR: 10 RSSI: -92

Case 2:

Only forward the messages from DevAddr: "XX1122XX" to the network server. Fport is not checked in this case.

Figure 5.1.2.1-C Whitelist Filter Case 2

Whitelist Filter

Enable <input checked="" type="checkbox"/>	Fport Filter	-1	(-1 or 1~223)	DevAddr Filter	XX1122XX
Enable <input type="checkbox"/>	Fport Filter	0	(-1 or 1~223)	DevAddr Filter	XXXXXXXX
Enable <input type="checkbox"/>	Fport Filter	0	(-1 or 1~223)	DevAddr Filter	XXXXXXXX

Figure 5.1.2.1-D Network Server Case 2

Gateways > pico-5813D3FFFE2984D2 > Live data

Time	Type	Data preview		Verbose stream		Export as JSON		Pause	
↑ 14:16:08	Receive uplink message	DevAddr:	CC 11 22 DD <>	FCnt:	2	FPort:	100	Data rate: SF7BW125 SNR: 9.3 RSSI: -61	
↑ 14:16:05	Receive uplink message	JoinEUI:	00 16 16 00 00 00 02 <>	DevEUI:	00 16 16 00 00 00 24 5A <>	Data rate: SF7BW125 SNR: 9.3 RSSI: -94			
↑ 14:15:59	Receive uplink message	DevAddr:	CC 11 22 DD <>	FCnt:	1	FPort:	22	Data rate: SF7BW125 SNR: 9.8 RSSI: -58	
🚀 14:15:51	Receive gateway status	Metrics: { rxin: 18, rxok: 17, rxfw: 17, ackr: 0, txin: 0, txok: 0 } Versions: { ttn-lw-gateway-server: "3.21.2-rc1-SNAP"							
↑ 14:15:51	Receive uplink message	JoinEUI:	00 16 16 00 00 00 02 <>	DevEUI:	00 16 16 00 00 00 24 5A <>	Data rate: SF7BW125 SNR: 9.5 RSSI: -91			
↑ 14:15:37	Receive uplink message	JoinEUI:	00 16 16 00 00 00 02 <>	DevEUI:	00 16 16 00 00 00 24 5A <>	Data rate: SF7BW125 SNR: 7.5 RSSI: -92			
↑ 14:15:30	Receive uplink message	DevAddr:	AA 11 22 BB <>	FCnt:	2	FPort:	22	Data rate: SF7BW125 SNR: 9.5 RSSI: -60	
↑ 14:15:23	Receive uplink message	JoinEUI:	00 16 16 00 00 00 02 <>	DevEUI:	00 16 16 00 00 00 24 5A <>	Data rate: SF7BW125 SNR: 10 RSSI: -97			
🚀 14:15:21	Receive gateway status	Metrics: { ackr: 0, txin: 0, txok: 0, rxin: 11, rxok: 10, rxfw: 10 } Versions: { ttn-lw-gateway-server: "3.21.2-rc1-SNAP"							
↑ 14:15:16	Receive uplink message	DevAddr:	AA 11 22 BB <>	FCnt:	1	FPort:	123	Data rate: SF7BW125 SNR: 7.5 RSSI: -56	
≡ 14:15:13	Console: Events cleared	The events list has been cleared							

Case 3:

Only forward the messages from DevAddr=0922ABCD and Fport=99 to the network server.

Figure 5.1.2.1-E Whitelist Filter Case 3

Whitelist Filter

Enable <input checked="" type="checkbox"/>	Fport Filter	99	(-1 or 1~223)	DevAddr Filter	0922ABCD
Enable <input type="checkbox"/>	Fport Filter	0	(-1 or 1~223)	DevAddr Filter	XXXXXXXX
Enable <input type="checkbox"/>	Fport Filter	0	(-1 or 1~223)	DevAddr Filter	XXXXXXXX

Figure 5.1.2.1-F Network Server Case 3

Gateways > pico-5813D3FFE2984D2 > Live data					Verbose stream <input type="checkbox"/>	Export as JSON
Time	Type	Data preview				
↑ 14:21:52	Receive uplink message	DevAddr: 09 22 AB CD <> FCnt: 3 FPort: 99 Data rate: SF8BW125 SNR: 11 RSSI: -59				
↑ 14:21:43	Receive uplink message	DevAddr: 09 22 AB CD <> FCnt: 2 FPort: 99 Confirmed uplink Data rate: SF8BW125 SNR: 9.5 RSSI: -58				
↑ 14:21:41	Receive uplink message	JoinEUI: 00 16 16 00 00 00 00 02 <> DevEUI: 00 16 16 00 00 24 5A <> Data rate: SF7BW125 SNR: 7.5				
↑ 14:21:38	Receive gateway status	Metrics: { ackI: 0, txin: 0, txok: 0, rxin: 10, rxok: 10, rxfw: 10 } Versions: { ttn-lw-gateway-server: "3.2.0" }				
↑ 14:21:34	Receive uplink message	DevAddr: 09 22 AB CD <> FCnt: 2 FPort: 99 Confirmed uplink Data rate: SF7BW125 SNR: 9.5 RSSI: -59				
↑ 14:21:25	Receive uplink message	DevAddr: 09 22 AB CD <> FCnt: 1 FPort: 99 Data rate: SF7BW125 SNR: 7.5 RSSI: -58				

5.1.3 Config Restore

Click the **"APPLY"** button to restore LoRa settings to the default value.

Figure 5.1.3-A Config Restore

LoRa Config Restore

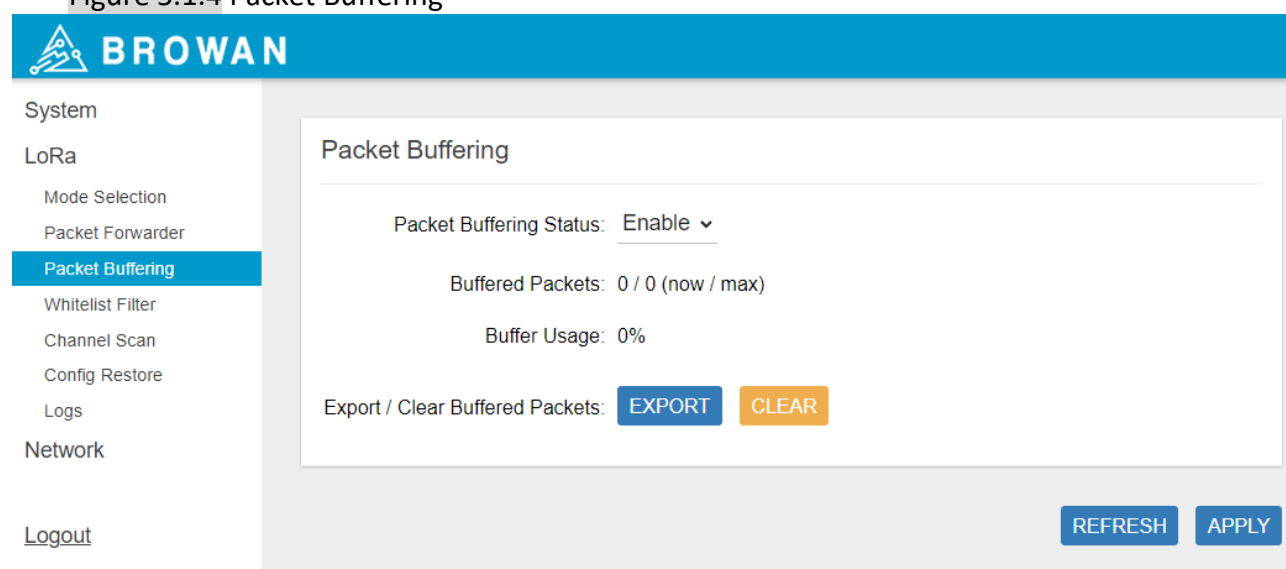
To restore LoRa settings to default, click "APPLY".

Restore LoRa settings to default: APPLY

5.1.4 Packet Buffering

Packet Buffer will only work in **LoRa Packet Forwarder mode**. It works when the gateway encounters backhaul issue caused by local network or cellular network. Packets will be queued in the flash and resume transmission in sequence when the backhaul is normal again. The maximum packet number that can be buffered in Pico Next gateway is **4000** frames. "**Packet Buffering**" field could be found on the left menu when enabling **LoRa Packet Forwarder mode**. Switch "**Packet Buffering Status**" to "**Enable**" and click the "**APPLY**" button to trigger this functionality. The GUI also shows you the usage of Buffered Packets and you could also **EXPORT** or **CLEAR** the Buffered Packets as needed. Exporting the packets will not delete the data.


Figure 5.1.4 Packet Buffering



5.1.5 Basic Station

Choose the "**Basic Station**" option and click the "**APPLY**" button to Enable the Basic Station mode. After applying the setting, the "Basic Station" field can be found on the left menu.

Figure 5.1.5-A LoRa Mode Selection - Basic Station


 Applying settings...

LoRa Mode Selection

Mode: Basic Station

APPLY

Figure 5.1.5-B LoRa Mode Selection - Basic Station menu

 BROWAN

System
 Radio Info
 Connection Configuration
 Power Settings

LoRa

Mode Selection
 Basic Station
 Config Restore
 Logs

 Network

[Logout](#)

Gateway EUI: 0016C001FF17DA39


Radio 0	Radio 1
Radio Type: SX1250	Radio Type: SX1250
RSSI Offset: -215.4	RSSI Offset: -215.4

RESTART SERVICE
 APPLY

5.1.5.1 Radio Info

This page shows the **Gateway EUI** information.

Figure 5.1.5.1-A Radio Info

 BROWAN

System
 Radio Info
 Connection Configuration
 Power Settings

LoRa

Mode Selection
 Basic Station
 Config Restore
 Logs

 Network

[Logout](#)

Gateway EUI: 0016C001FF17DA39

Radio 0	Radio 1
Radio Type: SX1250	Radio Type: SX1250
RSSI Offset: -215.4	RSSI Offset: -215.4

RESTART SERVICE
 APPLY

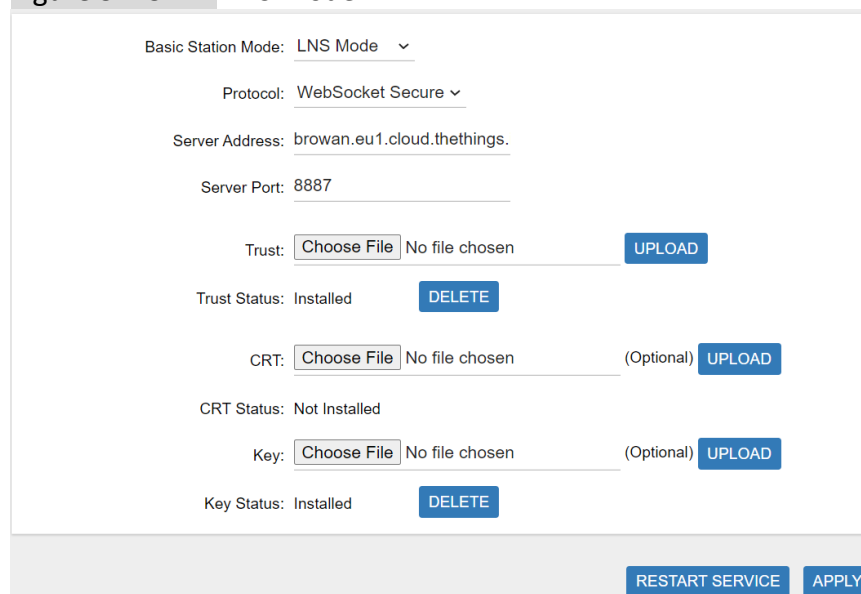
5.1.5.2 Connection Configuration

This page is for setting up the basic station configuration, including **Basic Station Mode**, **Protocol**, **Server Address**, **Server Port** and **Credentials**.

- LNS Mode

Configure the LNS Mode settings and click the "APPLY" button.

Figure 5.1.5.2-A LNS Mode

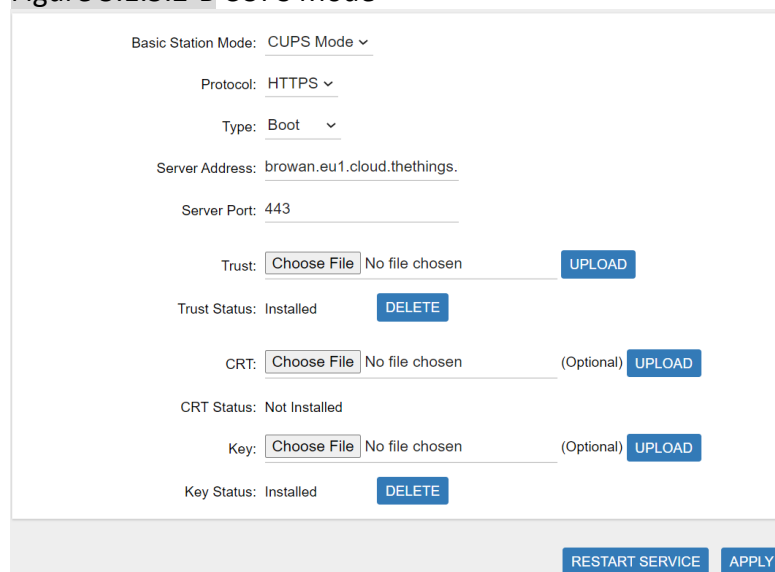


The screenshot shows the LNS Mode configuration interface. At the top, 'Basic Station Mode' is set to 'LNS Mode'. Below it, 'Protocol' is 'WebSocket Secure'. 'Server Address' is 'browan.eu1.cloud.thethings.' and 'Server Port' is '8887'. There are two sections for credentials: 'Trust' and 'CRT'. The 'Trust' section shows a file chosen, status 'Installed', and a 'DELETE' button. The 'CRT' section shows a file chosen, status 'Not Installed', and an 'UPLOAD' button. Below these, there is a 'Key' section with a file chosen, status 'Installed', and a 'DELETE' button. At the bottom right, there are 'RESTART SERVICE' and 'APPLY' buttons.

- CUPS Mode

Configure the CUPS Mode settings and click the "APPLY" button.

Figure 5.1.5.2-B CUPS Mode



The screenshot shows the CUPS Mode configuration interface. At the top, 'Basic Station Mode' is set to 'CUPS Mode'. Below it, 'Protocol' is 'HTTPS' and 'Type' is 'Boot'. 'Server Address' is 'browan.eu1.cloud.thethings.' and 'Server Port' is '443'. There are two sections for credentials: 'Trust' and 'CRT'. The 'Trust' section shows a file chosen, status 'Installed', and a 'DELETE' button. The 'CRT' section shows a file chosen, status 'Not Installed', and an 'UPLOAD' button. Below these, there is a 'Key' section with a file chosen, status 'Installed', and a 'DELETE' button. At the bottom right, there are 'RESTART SERVICE' and 'APPLY' buttons.

5.1.5.3 Power Settings

For more accurate Tx power, users may assign calibrated power profiles according to region in **Power Settings** page. Click **APPLY** to save the power profile for Basic Station reference.

Figure 5.1.5.3-A Power Settings

Radio Info Connection Configuration **Power Settings**

Power Settings

Use Profile : Default ▾

Default
US915
AU915
AS923-1
AS923-2
AS923-3
AS923-4
KR920

RESTART SERVICE

APPLY

5.1.6 Packet Forwarder with Embedded LNS

Embedded LNS is available in Packet Forwarder mode. For now, it only supports **ABP** (activation by personalization) end-nodes. Select **Packet Forwarder with Embedded LNS** and choose a support **Region Plan**.

Figure 5.1.6-A Packet Forwarder with Embedded LNS

Mode Selection

Mode: Packet Forwarder with Embedded LNS ▾


Disable
Packet Forwarder
Packet Forwarder with Embedded LNS
Basic Station

Region Plan:

APPLY

Select a support **Region Plan** and **APPLY**

Figure 5.1.6-B **APPLY** Packet Forwarder with Embedded LNS

 Applying settings...

Mode Selection

Mode: Packet Forwarder with Embedded LNS

Region Plan: AU915_0 (915.2MHz ~ 916.6MHz)

APPLY

5.1.6.1 Packet Forwarder with Embedded LNS - Status

Packet Forwarder page shows the Region Plan **Status**.

Figure 5.1.6.1-A Status of Frequency Assignments

Status

Frequency Assignments				
Gateway ID : 0016c001ff17da39				
Frequency : 915200000 Hz	Status : Enabled	Interface : Radio 0		
Frequency : 915400000 Hz	Status : Enabled	Interface : Radio 0		
Frequency : 915600000 Hz	Status : Enabled	Interface : Radio 0		
Frequency : 915800000 Hz	Status : Enabled	Interface : Radio 0		
Frequency : 916000000 Hz	Status : Enabled	Interface : Radio 1		
Frequency : 916200000 Hz	Status : Enabled	Interface : Radio 1		
Frequency : 916400000 Hz	Status : Enabled	Interface : Radio 1		
Frequency : 916600000 Hz	Status : Enabled	Interface : Radio 1		
Frequency : 915900000 Hz	Status : Enabled	Interface : Radio 0	Channel Bandwidth : 500 K	Spread Factor : 8

5.1.7 ABP

In **ABP** mode page, users may ADD/DELETE nodes. PicoNext gateway currently supports a maximum of **100** Nodes.

Figure 5.1.8-A **ADD** or **DELETE** nodes in ABP mode

System
LoRa
Mode Selection
Packet Forwarder
ABP
Node Parameters
Network Server
Whitelist Filter
Config Restore
Logs
Network
[Logout](#)

ABP

Note Due to APs limitation, total ABP counts should not over 100
Current count is : 4

1 /1

<input type="checkbox"/>	DevAddr	NwkSKey	NwkSKey CRC	AppSKey	AppSKey CRC	Region	
<input type="checkbox"/>	00010211	66A6B13B1E372D384C57 7BA3F76B429A	A616	53A6B13B1E372D384C57 7BA3F76B429C	E341	EU868	EDIT
<input type="checkbox"/>	00010212	66A6B13B1E372D384C57 7BA3F76B429B	66D7	53A6B13B1E372D384C57 7BA3F76B429A	E1C1	US915	EDIT
<input type="checkbox"/>	00010215	66A6B13B1E372D384C57 7BA3F76B429C	A496	53A6B13B1E372D384C57 7BA3F76B429B	2100	AU915	EDIT
<input type="checkbox"/>	0001021f	66A6B13B1E372D384C57 7BA3F76B429D	6457	53A6B13B1E372D384C57 7BA3F76B429D	2380	AS923	EDIT

[DELETE](#) [ADD](#)

After Click **ADD** on **ABP** page, input DevAddr/NwkSKey/AppSKey/Region and **SAVE** or **CANCEL** to add a node.

Figure 5.1.8-B ABP mode – ADD a node

ABP

Note Due to APs limitation, total ABP counts should not over 100
Current count is : 0

Parameter	Format	
DevAddr	8 HEX digits	<input type="text"/>
NwkSKey	32 HEX digits	<input type="text"/>
AppSKey	32 HEX digits	<input type="text"/>
Region	String	EU868 <input type="text"/>

[SAVE](#) [CANCEL](#)

5.1.8 Node Parameters

Node Parameters page shows the parameters of added LoRa Nodes. Users may search for a node through **APPLY** with the DevAddr.

Figure 5.1.8 Node Parameters-A

System	Search for this DevAddr : <input type="text"/> <input type="button" value="APPLY"/> <input type="button" value="CLEAR"/>							1 / 10
LoRa								
Mode Selection								
Packet Forwarder								
ABP								
Node Parameters								
Network Server								
Whitelist Filter								
Config Restore								
Logs								
Network								
Logout								

<input type="checkbox"/>	DevAddr	Rx1DrOffset	Rx2DataRate	Rx2Freq	Delay	Dwell Time	LastDownMsgSeqNo
<input type="checkbox"/>	10000001	0	8	923300000	1	0	0
<input type="checkbox"/>	10000002	0	8	923300000	1	0	0
<input type="checkbox"/>	10000003	0	8	923300000	1	0	0
<input type="checkbox"/>	10000004	0	8	923300000	1	0	0
<input type="checkbox"/>	10000005	0	8	923300000	1	0	0

Users may **DELETE** a node in the **ABP** table or **REFRESH** the table.

Figure 5.1.8 Node Parameters-B

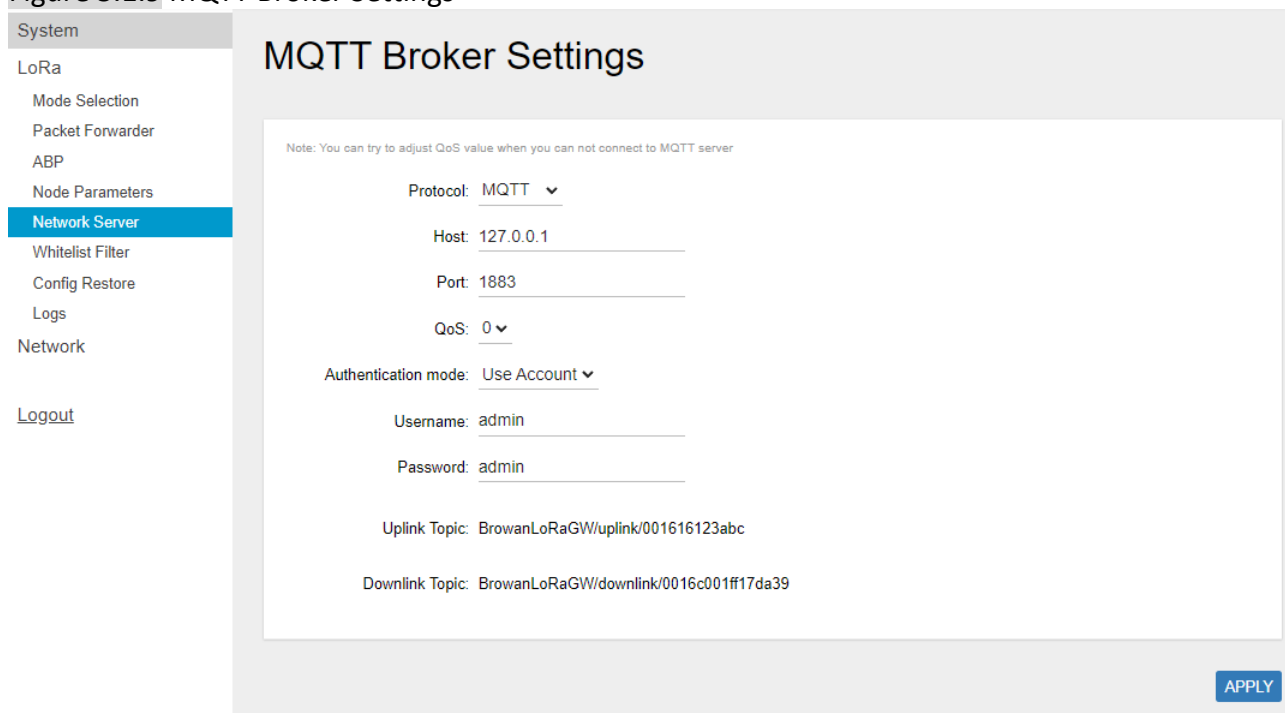
System								
LoRa								
Mode Selection								
Packet Forwarder								
ABP								
Node Parameters								
Network Server								
Whitelist Filter								
Config Restore								
Logs								
Network								
Logout								

<input type="checkbox"/>	10000015	0	8	923300000	1	0	0
<input type="checkbox"/>	10000016	0	8	923300000	1	0	0
<input type="checkbox"/>	10000017	0	8	923300000	1	0	0
<input type="checkbox"/>	10000018	0	8	923300000	1	0	0
<input type="checkbox"/>	10000019	0	8	923300000	1	0	0
<input type="checkbox"/>	10000020	0	8	923300000	1	0	0

5.1.9 Network Server

Network Server page supports MQTT Broker Settings to integrate Embedded LNS instance with MQTT so users can receive data and send downlinks to other backhaul servers. Users may define the MQTT Broker settings and click **APPLY**. enable/start it.

Figure 5.1.9 MQTT Broker Settings



5.1.10 Integration with Browan LNS

Here is an example describing how an Application Server may integrate with embedded Browan LNS on the PicoNext Gateway.

Publishing Downlink Topic (could be found on the GUI):

BrowanLoRaGW/downlink/\${GatewayEUI}

GatewayEUI: lora module EUI

The Application server could send a MQTT publish packet with the below content:

JSON format:

Item	Define
macaddr	DevAddr (HEX-String)
data	FRMPayload (HEX-String)
id	An unique downlink index (HEX-String, generate randomly)
port	FPort (Integer)
txpara	TX parameter, 1 byte for TX configuration which includes RX1W/RX2W, ClassA/C, Confirmed/Unconfirmed type (HEX-String)

Bits	7:5	4	3	2	1:0
Tx parameters	RFU	DLType	ACK	RXW	HDR

HDR : A header which fixes to '11'

RXW : The receive window. Set '0' to send downlink with RX1W or '1' with RX2W

ACK : Set '0' to send an Unconfirmed message or '1' send a Confirmed message

DLType : Set '0' to send Class A downlink or '1' send Class C downlink

For example:

GatewayEUI: 0016c001ff17da39

DevAddr: 92300001

FRMPayload: 01030926

Downlink index: 1685693890624-9rAW9VI7mGB8quiR8eN7Mal6

Fport: 2

TX parameter: 0B (00001011, RX1W/Confirmed/ClassA)

Here we have the Host address **127.0.0.1** and port **1883** that should match those on the GUI.

MQTT publish command:

```
mosquitto_pub -h 127.0.0.1 -p 1883 -t BrowanLoRaGW/downlink/0016c001ff17da39 --
insecure -m "[{"macAddr\":\"92300001\", \"data\":\"01030926\", \"id\":\"1685693890624-
9rAW9VI7mGB8quiR8eN7Mal6\", \"extra\":{\"port\":2, \"txpara\":\"0B\"}]}"
```

When published to the same downlink topic, the PicoNext gateway will arrange a downlink after receiving this message.

5.2 Channel Scan


Click the "**SCAN**" button to scan the RF signal. Then click the "**EXPORT**" button to export the scan result. However, channel scan is only available on specific HW SKUs. Please check with your contact window.

Figure 5.2-A Channel RSSI Scan

Channel Scan

The device can scan all supported channels based on ISM band regulation.

Note: The scanning process may take few minutes to complete, please wait until the end of process.

 Scanning channel now...

Channel Index	Channel Frequency	Noise indication

SCAN
EXPORT

Figure 5.2-B Scan Result

Channel Scan

The device can scan all supported channels based on ISM band regulation.

Note: The scanning process may take few minutes to complete, please wait until the end of process.

Select your target scan range : US915 ▼

Channel Index	Channel Frequency(Hz)	Noise indication(dBm)
Channel 0	902300000	-103
Channel 1	902500000	-103
Channel 2	902700000	-103
Channel 3	902900000	-103
Channel 4	903100000	-103
Channel 5	903300000	-103
Channel 6	903500000	-103
Channel 7	903700000	-103
Channel 8	903900000	-101
Channel 9	904100000	-100

5.3 Log

The LoRa logs will be shown on this page, showing recent LoRa logs with a maximum limit of 500 lines.

Figure 5.3-A Logs

LoRa Logs

```
2021-07-08 08:29:31.591 [TCE:VERB] Connected to MUXS.
2021-07-08 08:29:31.775 [RAL:INFO] Lora gateway library version: Version: 5.0.1;
2021-07-08 08:29:31.830 [RAL:VERB] Connecting to device: /dev/spidev1.0
2021-07-08 08:29:31.830 [RAL:DEBU] SX130x txlut table (0 entries)
2021-07-08 08:29:31.830 [RAL:VERB] SX1301 rxrfchain 0: enable=1 freq=867.5MHz rssi_offset=-166.000000 type=2 tx_enabl
2021-07-08 08:29:31.831 [RAL:VERB] SX1301 rxrfchain 1: enable=1 freq=868.5MHz rssi_offset=-166.000000 type=2 tx_enabl
2021-07-08 08:29:31.831 [RAL:VERB] SX1301 ifchain 0: enable=1 rf_chain=1 freq=-400000 bandwidth=0 datarate=0 sync_wc
2021-07-08 08:29:31.831 [RAL:VERB] SX1301 ifchain 1: enable=1 rf_chain=1 freq=-200000 bandwidth=0 datarate=0 sync_wc
2021-07-08 08:29:31.832 [RAL:VERB] SX1301 ifchain 2: enable=1 rf_chain=1 freq=0 bandwidth=0 datarate=0 sync_word=0/6
2021-07-08 08:29:31.832 [RAL:VERB] SX1301 ifchain 3: enable=1 rf_chain=0 freq=-400000 bandwidth=0 datarate=0 sync_wc
2021-07-08 08:29:31.832 [RAL:VERB] SX1301 ifchain 4: enable=1 rf_chain=0 freq=-200000 bandwidth=0 datarate=0 sync_wc
2021-07-08 08:29:31.832 [RAL:VERB] SX1301 ifchain 5: enable=1 rf_chain=0 freq=0 bandwidth=0 datarate=0 sync_word=0/6
2021-07-08 08:29:31.833 [RAL:VERB] SX1301 ifchain 6: enable=1 rf_chain=0 freq=200000 bandwidth=0 datarate=0 sync_wor
2021-07-08 08:29:31.833 [RAL:VERB] SX1301 ifchain 7: enable=1 rf_chain=0 freq=400000 bandwidth=0 datarate=0 sync_wor
2021-07-08 08:29:31.833 [RAL:VERB] SX1301 ifchain 8: enable=1 rf_chain=1 freq=-200000 bandwidth=2 datarate=2 sync_wc
```

REFRESH

6 Network

The Network menu consists of the following categories: **WAN** and **Diagnostics**. Introduction and input procedures for each category are described in the following paragraphs.

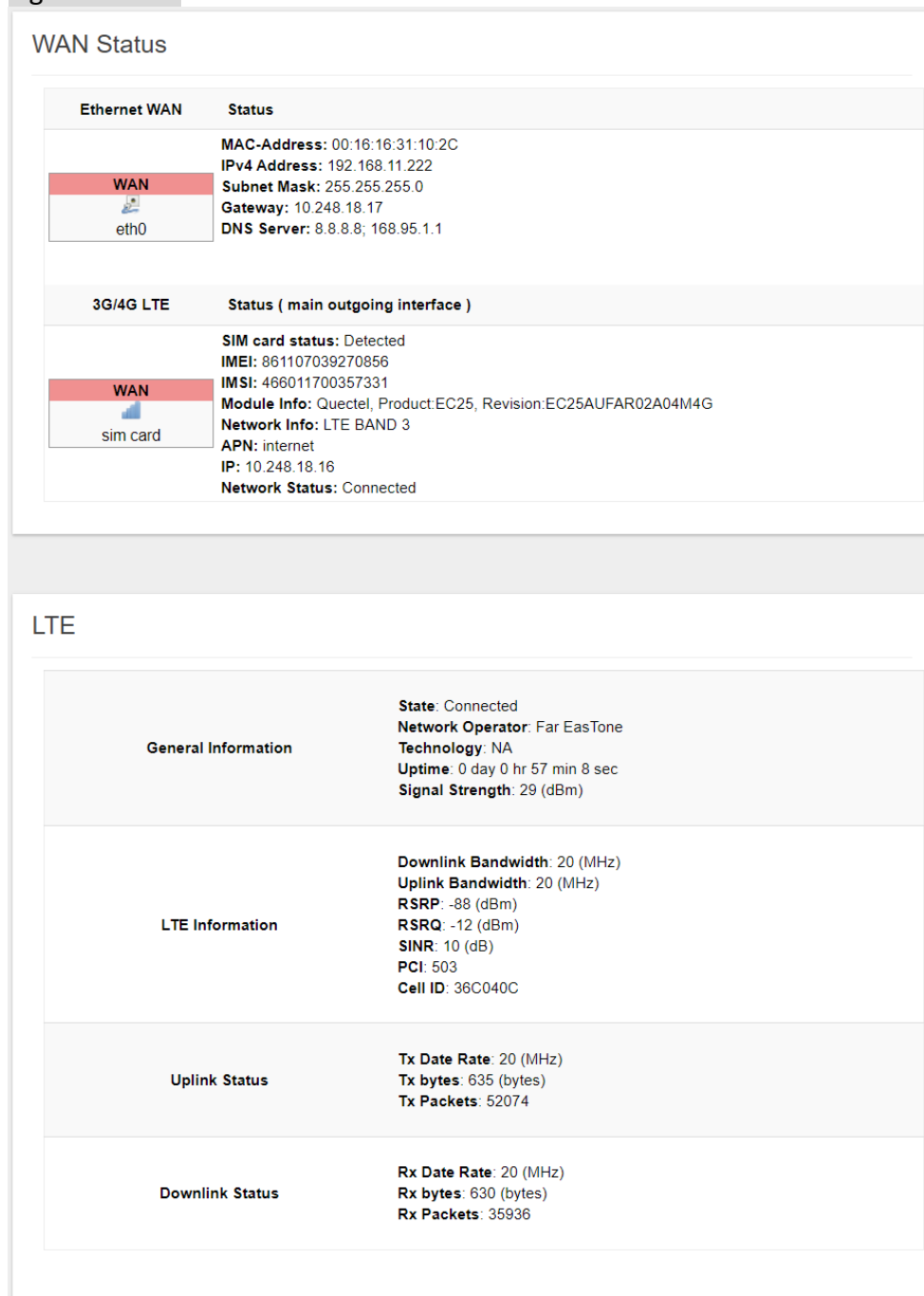
6.1 WAN

The purpose of this category is to view current WAN settings. This category is further divided into three sectors: **WAN Status**, **Wan Settings** and **3G/4G LTE Log**. These individual options are lodged and labeled above the main content.

6.1.1 WAN Status

The current network status will be shown on this page.

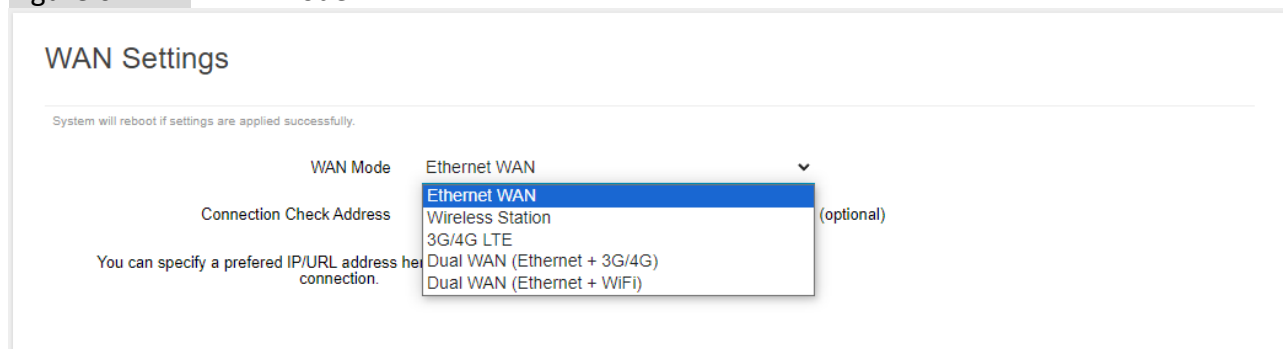
Figure 6.1.1-A WAN Status



6.1.2 WAN Settings

Pico Next supports 5 WAN Modes: **Ethernet WAN**, **3G/4G LTE**, **Wi-Fi Station**, **Dual WAN (Ethernet+3G/4G)** and **Dual WAN(Ethernet+WiFi)**.

Figure 6.1.2-A WAN Mode

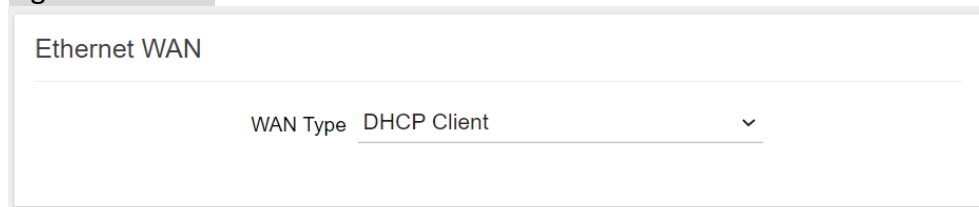


The screenshot shows the 'WAN Settings' page. At the top, it says 'System will reboot if settings are applied successfully.' Below this, there's a 'WAN Mode' dropdown menu currently set to 'Ethernet WAN'. A dropdown menu is open, showing the following options: 'Ethernet WAN' (highlighted), 'Wireless Station', '3G/4G LTE', 'Dual WAN (Ethernet + 3G/4G)', and 'Dual WAN (Ethernet + WiFi)'. To the right of the dropdown, there's a '(optional)' label. Below the dropdown, there's a 'Connection Check Address' field with a note: 'You can specify a preferred IP/URL address here for connection check.'

6.1.2.1 Ethernet WAN

- DHCP Client

Figure 6.1.2.1-A DHCP Client



The screenshot shows the 'Ethernet WAN' settings page. At the top, it says 'Ethernet WAN'. Below this, there's a 'WAN Type' dropdown menu set to 'DHCP Client'.

- Static IP

Figure 6.1.2.1-B Static IP

Ethernet WAN

WAN Type	Static IP	▼
IP Address	192.168.11.222	
Subnet Mask	255.255.255.0	
Gateway	192.168.11.1	
DNS Server	8.8.8.8	
	168.95.1.1	(optional)





6.1.2.2 Wireless Station


Configure “WiFi Access Point” information. You could add/del KEYS (4 most) to try on the same SSID.

Figure 6.1.2.2-A Wireless Station Settings

Wireless Station

Click "Scan" to get Access Point List and you can set max 5 passwords for a SSID.

SSID:	Box_Box		
Security:	WPA/WPA2-PSK ▼		
KEY:	••••••		
	••••••		
	Box_Box	▼	



6.1.2.3 3G/4G LTE

Configure “APN” information according to mobile service provider requirements. The PLMN ID also can be supported.

Figure 6.1.2.3-A LTE Settings

3G/4G LTE

APN

Use PLMN ID


☒

* PLMN ID = MCC (3 digits) + MNC (2 or 3 digits)

MCC

MNC

PIN

(optional) 

Authentication

▼ (optional)

Username

(optional)

Debug mode

▼

(After enabling this feature, you can export the debug log in "3G/4G LTE Log" section when you have connection issues.)

6.1.2.4 Dual WAN (Ethernet+3G/4G)

Configure the Ethernet Setting and LTE Setting at the same time. If the Dual WAN mode is selected, the primary interface needs to be specified by default. Pico Next Gateway will automatically set the other workable interface to be the backhaul.

Figure 6.1.2.4-A Network Primary

WAN Settings

System will reboot if settings are applied successfully.

WAN Mode

▼

Network priority

▼ (Specify which WAN is Primary, the other one will be backup)

Figure 6.1.2.4-B Ethernet and LTE Configuration

Ethernet WAN

WAN Type
DHCP Client

3G/4G LTE

APN
internet

Use PLMN ID
☐
* PLMN ID = MCC (3 digits) + MNC (2 or 3 digits)

MCC

MNC

PIN
(optional)

Dial number
(optional)

Authentication
NONE
(optional)

Username
(optional)

Password
(optional)

Debug mode
Disable

(After enabling this feature, you can export the debug log in "3G/4G LTE Log" section when you have connection issues.)

6.1.2.5 Dual WAN (Ethernet+WiFi)

Configure the Ethernet Setting and Wi-Fi Station Setting at the same time. If the Dual WAN mode is selected, the primary interface needs to be specified by default. Pico Next Gateway will automatically set the other workable interface to be the backhaul.

Figure 6.1.2.5-A Network Primary

WAN Settings

System will reboot if settings are applied successfully.

WAN Mode
Dual WAN (Ethernet + WiFi)

Network priority
WiFi
(Specify which WAN is Primary, the other one will be backup.)

Figure 6.1.2.5-B Ethernet and WiFi Station Configuration

Ethernet WAN

WAN Type DHCP Client

Wireless Station

Click "Scan" to get Access Point List and you can set max 5 passwords for a SSID.

SSID: Box_Box

Security: WPA/WPA2-PSK

KEY:

SCAN

Box_Box

6.1.2.6 Connection Check Address

A **Connection Check Address** may be specified for the system to check. It will be added into the network check, and Internet LED behavior and LoRa service will adjust accordingly. This allows users with local LSN to be able to check internet status through LED behavior.

Figure 6.1.2-B WAN Mode – Connection Check Address

WAN Settings

System will reboot if settings are applied successfully.

WAN Mode Ethernet WAN

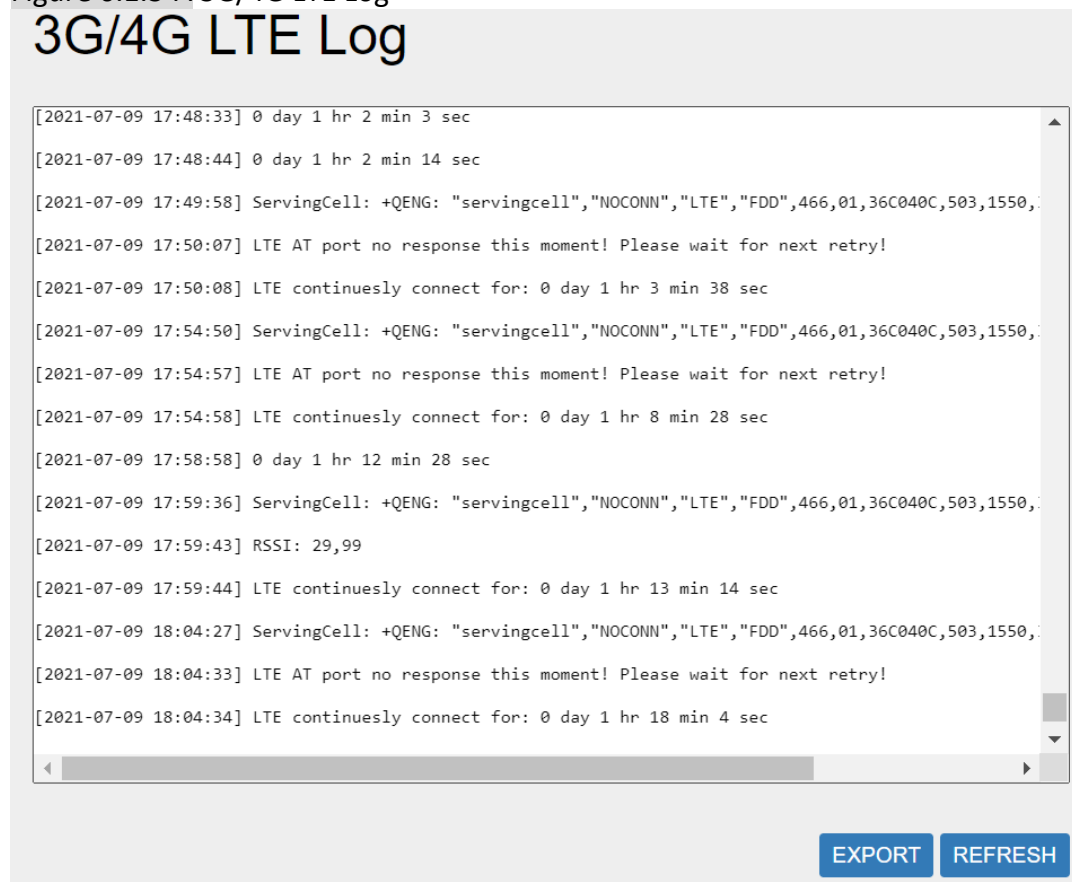
Connection Check Address 192.168.88.1 (optional)

You can specify a preferred IP/URL address here for checking network connection.

6.1.3 3G/4G LTE Log

If LTE Debug Mode is enabled, the LTE connection logs will be shown on this page. Click the "EXPORT" button to export the log.

Figure 6.1.3-A 3G/4G LTE Log



6.2 VPN

The VPN menu consists of the following categories: **VPN Settings** and **VPN Log**. An introduction for each category and input procedures are described in the following paragraphs.

6.2.1 VPN Settings

This page is for configuring OpenVPN Client settings, including **Import a config file** or **Customize a config file**.



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Figure 6.2.1-A Import a config file

OpenVPN Client Settings

Here you can import a config file or manually config a VPN setting file.

Service State Enable

Config Type Import a config file

Import config file: Choose File No file chosen UPLOAD

Username/Password Authentication ☒ (Please add "auth-user-pass /etc/openvpn/auth.cfg" in the imported config file while enabling this.)

Username test-user

Password *****

Config Status Installed DELETE

Note: Due to dual WAN mode is running, gateway info pushed from VPN server will be ignored

Figure 6.2.1-B Customize a config file

OpenVPN Client Settings

Here you can import a config file or manually config a VPN setting file.

Service State Enable

Config Type Customize a config file

Interface Type TUN

Protocol UDP

Server Hostname/IP 172.16.99.111

Server Port 1194

Username/Password Authentication ☐

Encryption Cipher AES-256-CBC

Minimum TLS Version Default

Certificate and Keys CONFIGURE

Other settings (Optional, max 1024 characters)

```
persist-tun
remote-cert-tls server
auth SHA256
data-ciphers AES-256-CBC
route 10.99.1.0 255.255.255.0
route-metric 50
comp-lzo
verb 3
allow-compression yes
```

Note: Due to dual WAN mode is running, gateway info pushed from VPN server will be ignored

6.2.2 VPN Log

The VPN connection log will be shown on this page.

Figure 6.2.2-A VPN Log

VPN Settings VPN Log

```
2022-07-05 10:59:21 Incoming Data Channel: Cipher 'AES-128-CBC' initialized with 128 bit key
2022-07-05 10:59:21 Incoming Data Channel: Using 160 bit message hash 'SHA1' for HMAC authentication
2022-07-05 10:59:21 net_route_v4_best_gw query: dst 0.0.0.0
2022-07-05 10:59:21 net_route_v4_best_gw result: via 192.168.11.244 dev eth0
2022-07-05 10:59:21 ROUTE_GATEWAY 192.168.11.244/255.255.255.0 IFACE=eth0 HWADDR=00:16:16:2b:aa:ac
2022-07-05 10:59:21 TUN/TAP device tun0 opened
2022-07-05 10:59:21 net_iface_mtu_set: mtu 1500 for tun0
2022-07-05 10:59:21 net_iface_up: set tun0 up
2022-07-05 10:59:21 net_addr_ptp_v4_add: 10.99.1.6 peer 10.99.1.5 dev tun0
2022-07-05 10:59:21 net_route_v4_add: 10.99.1.0/24 via 10.99.1.5 dev [NULL] table 0 metric 50
2022-07-05 10:59:21 GID set to nogroup
2022-07-05 10:59:21 UID set to nobody
2022-07-05 10:59:21 WARNING: this configuration may cache passwords in memory -- use the auth-nocache option to prevent this
2022-07-05 10:59:21 Initialization Sequence Completed
```

6.3 Diagnostics

Input a specific URL in the text field. Click the “PING” button to ping the URL specified

Figure 6.3-A Network Utilities

Network Utilities

Note :

If the ping test is fail, please check your network setting.

- Ethernet: Please make sure your backhaul network is available.

www.browan.com

PING

Collecting data

```
PING www.browan.com (44.241.247.162): 56 data bytes
64 bytes from 44.241.247.162: seq=0 ttl=219 time=197.869 ms
64 bytes from 44.241.247.162: seq=1 ttl=225 time=154.677 ms
64 bytes from 44.241.247.162: seq=2 ttl=219 time=189.352 ms
64 bytes from 44.241.247.162: seq=3 ttl=225 time=154.293 ms
64 bytes from 44.241.247.162: seq=4 ttl=219 time=187.985 ms

--- www.browan.com ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 154.293/176.835/197.869 ms
```