Cambium Networks™

USER GUIDE

cnPilot Home Router

System Release 4.8

Contents

About This User Guide

This manual provides basic information about how to install and deploy the cnPilot Home Routers. For remote configuration and deployment, an Internet connection is required.

The cnPilot Home Router is a managed device (that yet can act as a stand-alone router if desired). In addition to Wi-Fi, this product provides high quality voice calls (VoIP models only) as well as the optional ability to power Cambium Networks ePMP series Subscriber Module(SM) or the PMP450 series SM by supporting Cambium Networks (Canopy) PoE. For voice calls, the product is fully compatible with the SIP industry standard and can interoperate with many other SIP devices and softwares.

This guide contains the following chapters:

- Chapter 3: Advanced Configuration
- Chapter 4: Troubleshooting

Declaration of Conformity

Part 15 FCC Rules

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

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

Class B Digital Device or Peripheral

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 can generate, use and radiate radio frequency energy. If not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference does not occur in an installation.

Note

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

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 interferences 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.

GNU GPL Information

cnPilot Home Router firmware contains third-party software under the GNU General Public License (GPL). Refer the GPL for exact terms and conditions of the license. Important regulatory information.

Conventions, warnings, Attention, and notes

The following describes how conventions, warnings, attention, and notes are used in this document and in all documents of the Cambium Networks document set.

Conventions

The following convention is used throughout this User Guide:

cnPilot Home Router: Cambium cnPilot Home and Small Business Wireless Router family (cnPilot r190V/r190W/r195W/r195P/r200/r200P/r201/r201P/r201W Home Router models)

Warnings

Warnings precede instructions that contain potentially hazardous situations. Warnings are used to alert the reader to possible hazards that could cause loss of life or physical injury. A warning has the following format:

Warning

Warning text and consequence for not following the instructions in the warning.

Attention

Attention precedes instructions and are used when there is a possibility of damage to systems, software, or individual items of equipment within a system. However, this damage presents no danger to personnel. Attention has the following format:

Attention

Attention text and consequence for not following the instructions.

Notes

A note means that there is a possibility of an undesirable situation or provides additional information to help the reader understand a topic or concept. A note has the following format:

Note

Note text.

Chapter 1: Product Description

This chapter contains the following topics:

- LED Indicators and interfaces (r190V/r190W/r200/r200P/r195W/r195P)
- LED Indicators and interfaces (r190V/r190W/r200/r200P)
- LED Indicators and interfaces (r201/r201P/r201W))
- Hardware installation
- Configuring the router
- New in this release

LED Indicators and interfaces (r190V/r190W/r200/r200P/r195W/r195P)

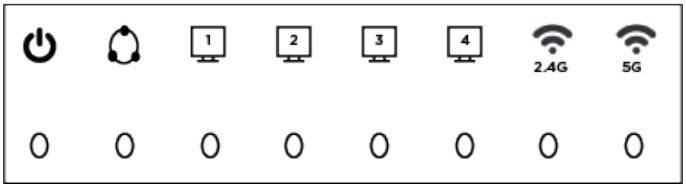


Figure 1: *cnPilot LED indicators*

LED	Status	Explanation
2.4G	Blinking (Green)	2.4G is connected, and there is data transmitted
	On (Green)	Wireless access point is ready
	Off	2.4G WiFi off or system is powered off
5G	Blinking (Green)	5G is connected, and there is data transmitted
	On (Green)	Wireless access point is ready
	Off	5G WiFi off or system is powered off
WAN	Blinking (Green)	There is data being transmitted
	On (Green)	Network is connected (physical connection established), no data transmission
	Off	System is powered off or the network port is not connected to the network device

LED	Status	Explanation
LAN (1-4)	Blinking (Green)	There is data being transmitted
	On (Green)	Network is connected (physical connection established), no data transmission
	Off	System is powered off or the network port is not connected to the network device
POWER	On (Green)	System is powered ON
	Off	System is powered OFF

LED Indicators and interfaces (r190V/r190W/r200/r200P)

Front Panel of cnPilot r200/r200P Home Router

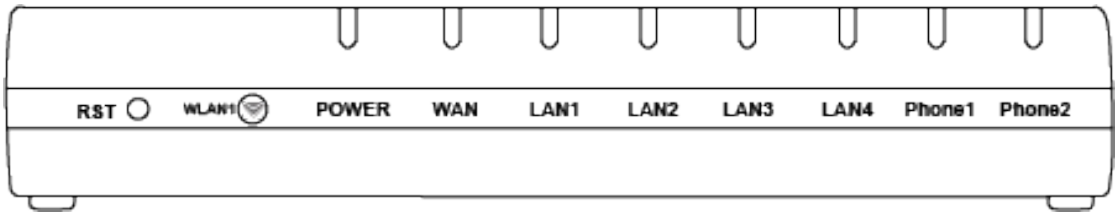


Table 1: cnPilot r200/r200P LED indicators

LED	Status	Explanation
Phone1/2	Blinking (Green)	Not registered
	On (Green)	Registered
LAN 1/2/3/4	On (Green)	Port is connected at 100 Mbps
	Off	The port is disconnected
	Blinking (Green)	Transmitting data
WAN	On (Green)	Port is connected with 100 Mbps
	Off	The port is disconnected
	Blinking (Green)	Blinks while transmitting data
POWER	On (Green)	The router is powered on and running normally
	Off	The router is powered off
WLAN	On (Green)	Wireless access point is ready
	Blinking (Green)	Blinks while wireless traffic goes through

Front Panel of cnPilot r190V/r190W Home Router

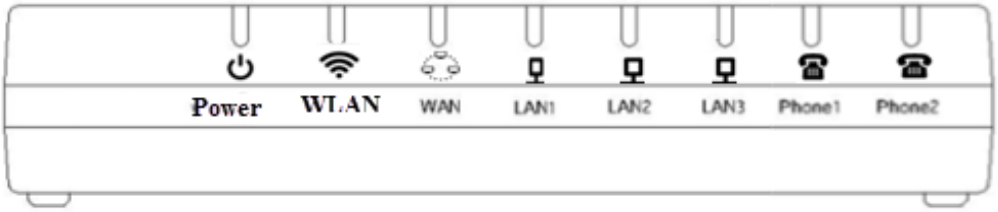


Table 2: cnPilot r190V/r190W LED indicators

LED	Status	Explanation
Power	On	Power is ON/Device is ready
	Blinking on 10Hz	Firmware upgrade
	Blinking on 1Hz	No IP Address for both PPPoE or DHCP mode
WAN/LAN	On	Link is Up
	Blinking	Blinks while transmitting data
	Off	Disconnected
FXS	Off	Unregistered
	On	Registered
	Blinking on 1 Hz	In use

Rear Panel of cnPilot r190V/r190W/r200/r200P Home Router

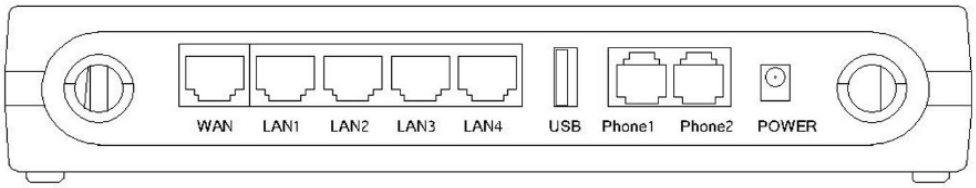


Table 3: cnPilot r190V/r190W/r200/r200P interfaces Home Routers

Interface	Description
POWER	Connector for a power adapter
Phone1/2	ATA Analog phone connector
USB	USB interface
WAN	Connector for accessing the Internet
LAN (1/2/3/4)	Connectors for local networked devices

LED indicators and interfaces (r201/r201P/r201W)

Front Panel of cnPilot r201/r201P/r201W Home Router

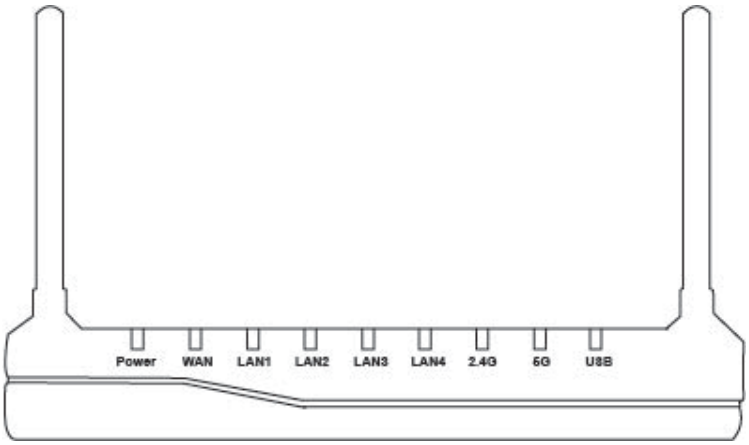


Table 4: cnPilot r201/r201P/r201W LED indicators

LED	Status	Explanation
USB	On (Green)	Connected
	Off	Disconnected
2.4G/5G	Blinking (Green)	The port is passing data
	On (Green)	The port is connected
WAN	Off	The port is disconnected
	Blinking (Green)	The data is transmitting
	On (Green)	The port is connected at 100/1000 Mbps
LAN 1/2/3/4	Off	The port is disconnected
	Blinking (Green)	The port is transmitting data
POWER	ON (Green)	Router is powered on and running normally
	Off	The router is powered off

Table 5: cnPilot r201/r201P/r201W interfaces

Interface	Description
ON/OFF	Power Switch
POWER	Connector for a power adapter
USB	USB interface
LAN (1/2/3/4)	Connectors for local networked devices
WAN	Connector for accessing the Internet

Hardware installation

Before configuring the router, refer the following procedure for instructions on connecting the cnPilot Home Router into the network.

Note

Ensure that the equipment is operated in accordance with the applicable regulations. It is operator's responsibility to ensure that the latest Firmware updates are applied. Download the latest Firmware and install it in the device before deploying the cnPilot Home Router. The latest Firmware is available on Cambium Networks Support Site and the instructions for installing the Firmware are provided in the Firmware upgrade section.

Configuring the router

To configure the router, perform the following steps:

1. Connect analog phone to ATA Port with an RJ11 cable.
2. Connect the WAN port to the Internet via your network's modem/switch/router/ADSL equipment using an Ethernet cable.
3. Connect one end of the power cord to the power port of the device and the other end to the wall outlet.
4. Press ON/OFF button to power on the router (if available).
5. Check the Power, WAN, and LAN LEDs to confirm network connectivity.

Warning

Do not attempt to use unsupported power adapters and do not remove power during configuring or updating the cnPilot Home Router device. Using other power adapters may damage the cnPilot Home Router and will void the manufacturer warranty.

Warning

Changes or modifications not expressly approved by the party responsible for compliance can void the user's authority to operate the equipment.

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 measures.

New in this release

> **Note**
>
> This product meets the UL/cUL 62368 /IEC 62368 edition 2 specification.

cnPilot Home Router specifications

Features	r190V	r190W	r200P	r200	r201	r201P	r201W	r195W	r195P
WAN	1xFE				1xGE				
LAN	3xFE	4xFE			4xGE				
Wi-Fi 2.4GHz	2X2 802.11 b/g/n								
Wi-Fi 5GHz	X				2X2 5GHz 802.11ac (867 Mbps)				
USB	X	X	1X USB 2.0					X	1 USB 2.0 Host Port for shared storage
VoIP	2xFXS[1]	X	2xFXS[1]				X	X	2xFXS[2]
Cambium PoE Out (30V)	X		Yes[3]	X	X	Yes[4]	X	X	Yes
Power Adapter	12V/1A	5V/1A	12V/3A	12V/2A	12V/2A	12V/3A	12V/2A	12V/1A	12V/3A
cnMaestro Managed	✓								
RAM	128MB		64MB		256MB			64MB	128MB
Flash	16MB								32MB

[1]A maximum of four devices may be connected to each FXS port.

[2]A maximum of four devices may be connected to each FXS port.

[3]One PMP or ePMP device at a time may be powered by the Power-over-Ethernet (PoE) port.

[4]One PMP or ePMP device at a time may be powered by the Power-over-Ethernet (PoE) port.

Chapter 2: Basic Settings

This chapter contains the following topics:

- Web management interface
- Accessing and Configuring cnPilot Home Router via cnMaestro

Web management interface

cnPilot Home Routers feature a web browser-based interface that may be used to configure and manage the device. See below for information.

> **Note**
>
> By default, only https access is allowed. Any attempt to access the device UI over http will now be automatically redirected to https.

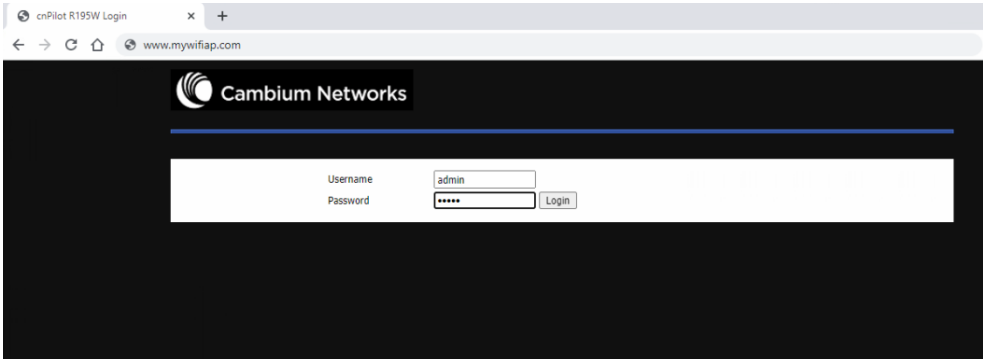
EZ UI

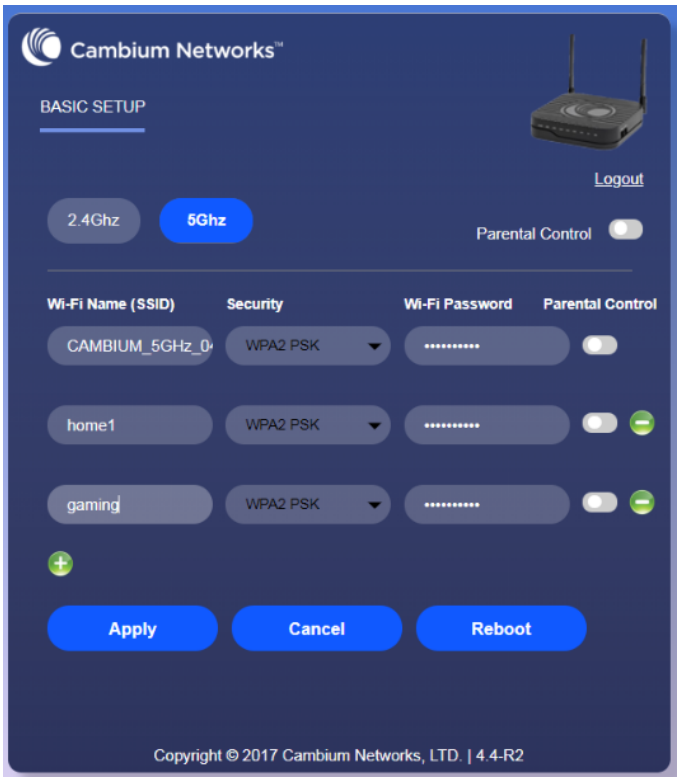
cnPilot Home Routers provides an additional simplified management interface for home users. The home users can connect to any of the LAN port of the device and type **www.mywifiap.com** in the browser to access the **EZ UI**.

Home users needs to provide the default **Basic User** credentials as **useradmin/admin**.

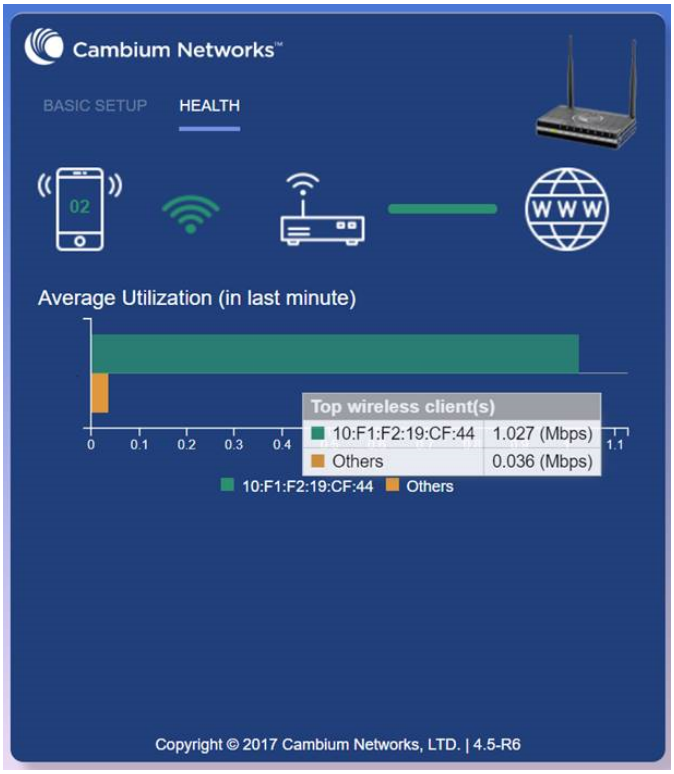
> **Note**
>
> Check with your ISP if the basic user credentials are changed to improved security.

Figure 2: *EZ UI*



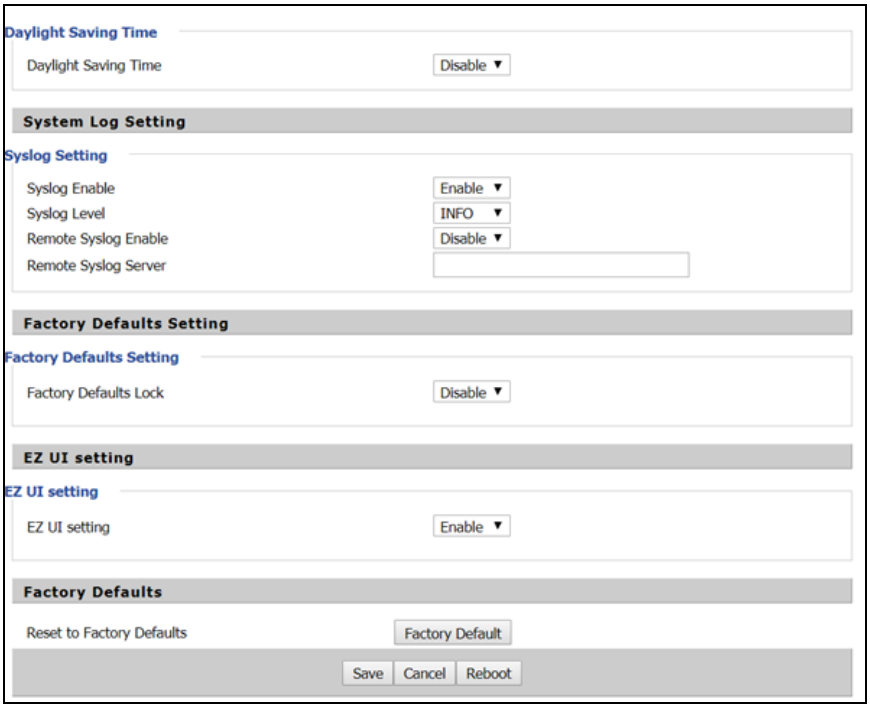


The ISP allows the home user to access the EZ UI through a wireless client connected to the cnPilot Home Router. Using the EZ UI, the user can easily change the basic device configurations such as Wi-Fi names, Wi-Fi passwords and parental control.



The EZ-UI now has a new HEALTH tab, which shows the overall health of the home network. It helps isolate problems if any and provide basic insight into the bandwidth utilization.

> **Note**
>
> An option is provided to disable EZ-UI and revert to the conventional Basic User mode UI.



EZ UI Co-branding

The user can add the customized new logo alongside to Cambium Networks logo in the EZ-UI page. To upload customized logo, under **EZ UI Logo Upload**, browse and select the logo, and then click **Upload**. The following Figure 3 describes the the uploading of the new logo. To revert back to the default logo setting, select **Disable** for **EZ UI Upload Setting**. To customize the EZ UI, download **EZ-UI cambium co-brand.css** file from Cambium Networks Support site and modify as required.

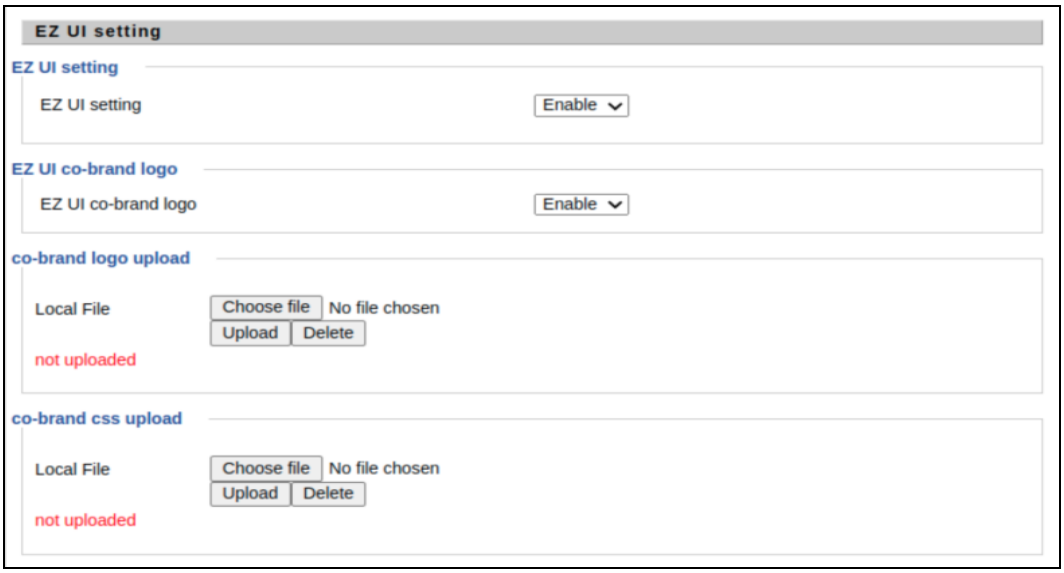


Figure 3: *EZ UI Co-branding*

Logging in from the LAN port

Ensure that your PC is connected to the router's LAN port correctly.

Note

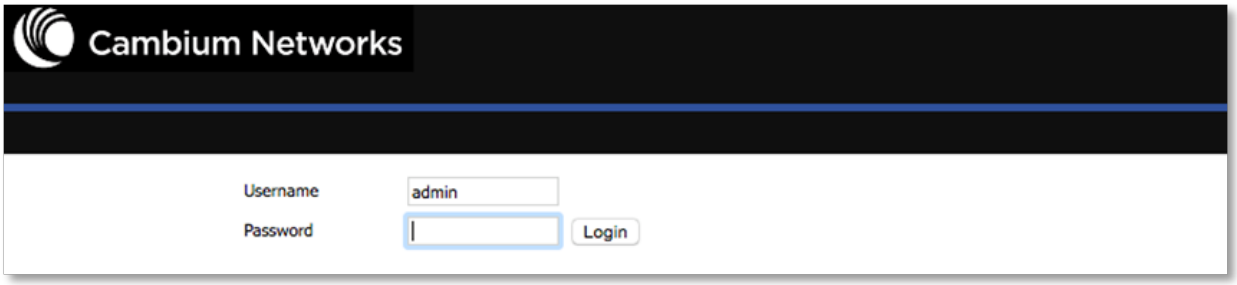
You may either set up your PC to get an IP dynamically from the router or set up the IP address of the PC to be the same subnet as the default IP address of router is 192.168.11.1. For more information, refer Configuring PC to get IP Address automatically.

Note

Management access from a wireless client is enabled by default.

Open a web browser on your PC and type **https://192.168.11.1/.** The following window appears to enter Username and Password.

Figure 4: *Login Prompt – LAN Port*



For administrator mode operation, type **admin/admin** for Username/Password and click **Login** to begin the configuration. For user mode operation, type **user/user** for Username/Password and click **Login** to begin configuration.

> **Note**
>
> If you are unable to access the web configuration. For more information, refer to Configuring PC to get IP Address automatically section.

The web management interface automatically logs out the user after five minutes of inactivity.

Logging in from the WAN port

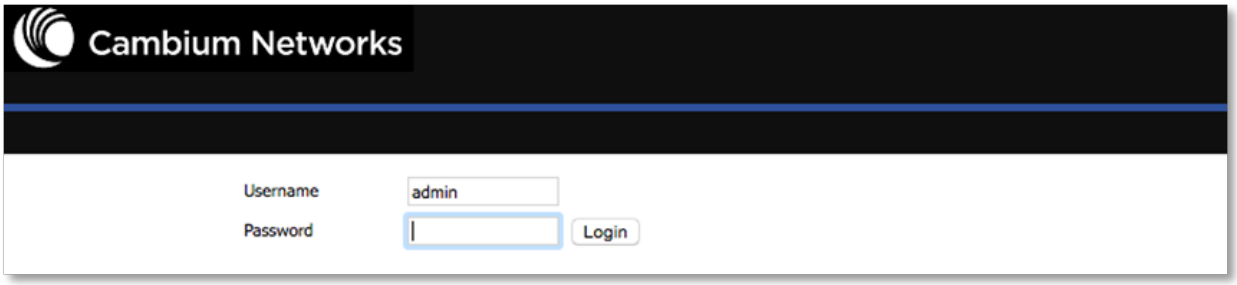
> **Note**
>
> By default, the web access from WAN interface is disabled from 4.3.3 release onwards for security reasons for cnPilot r190/r200/r201. Users can enable this from GUI (via LAN client).
>
> For r195W WAN access is enabled by default, however login is not allowed if default admin credentials are configured on the device. cnPilot r195W Home Router UI can be accessed via WAN by setting non default admin credentials.

Ensure that your PC is connected to the router's WAN port correctly.

Obtain the IP addresses of WAN port using Voice prompt or by logging into the device web management interface via a LAN port and navigating to **Status** page.

Open a web browser on your PC and type **https://<IP address of WAN port>**. The following login page appears to enter username and password.

Figure 5: *Login Prompt – WAN Port*



For administrator mode operation, type **admin/admin** for Username/Password and click **Login** to begin configuration. For user mode operation, type **user/user** for Username/Password and click **Login** to begin configuration.

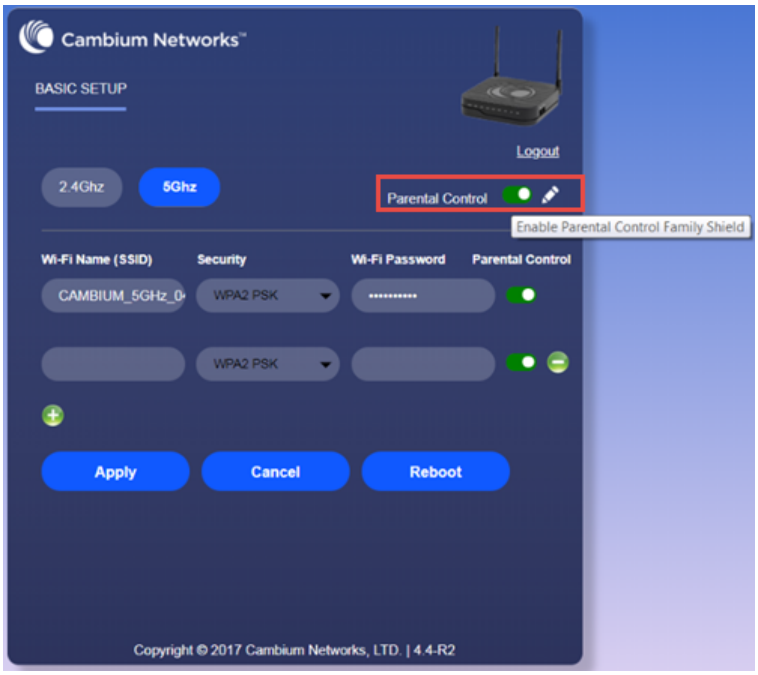
> **Note**
>
> If you fail to access to the web configuration. For more information, refer to Troubleshooting section .

The web management interface automatically logs out the user after five minutes of inactivity.

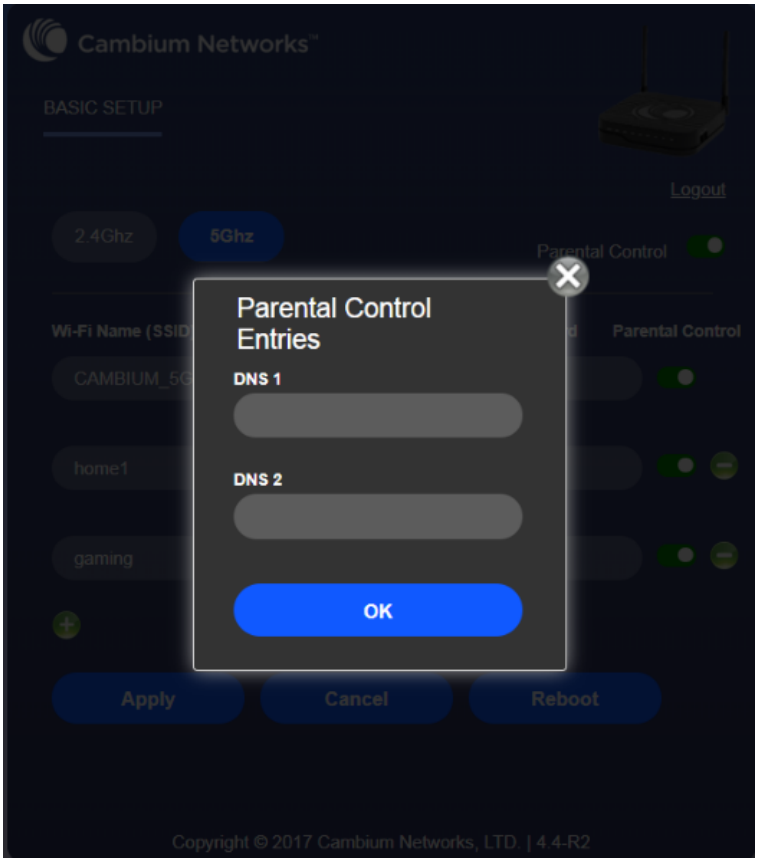
Parental Control

cnPilot Home Routers provide parental control feature for home users. Parental control allows home users to restrict access to unlawful/adult content over their WiFi network. This feature is based on external DNS filtering (like OpenDNS).

Parental control feature enable/disable is only available via EZ UI. To enable parental control feature, tap **Parental Control** button.



Configure cnPilot Home Router with the DNS server IP(s) provided by the parental control service provider.



Parental control feature can be applied only to a specific WiFiName/SSID while the other SSIDs can be free from any such restrictions. Once the device is setup for Parental control service, any DNS request from its clients will be forwarded to the external DNS servers configured for filtering/restricting the content.

When parental control is enabled, it is applied to all the LAN clients and it cannot be disabled for specific LAN ports.

Accessing and Configuring cnPilot Home Router via cnMaestro

cnMaestro is the Cambium Networks next generation network management system which is the recommended for managing Cambium Networks cnPilot Home Routers. As Cambium Networks develops new features, you may find the latest information on operating these features at the Cambium Networks Community Forum.

Register at Cambium Networks support forum for instructions, discussions, and helpful tips on managing cnPilot Home Routers.

Managing device via cnMaestro

cnMaestro is a suite of cloud-based tools for network management: inventory management, onboarding devices, daily operations and maintenance. cnMaestro offers full visibility across the entirety of a network.

Preparing the device

The following are the prerequisites to prepare the device:

1. Power on the **cnPilot Home Router** and configure the IP Address using either the **DHCP** or **Static** mode.
2. Check for the Internet connectivity. This is required, as the device needs to communicate with the cnMaestro Server hosted in the AWS.
3. Allow the IP Addresses of the devices in the Firewall Server using an ACL. Also, enable the protocols like HTTP/HTTPS and SSL.

   This is required as the device communicates with the cnMaestro Server using web sockets and for security reasons SSL certificates are exchanged between the device and the cnMaestro Serve
4. Devices with default configuration can configure to https://cloud.cambiumnetworks.com. Users may choose to configure alternateOn-Premises IP address/URL.

Note

In 4.6 release, the following options are introduced under **cnMeastro Configuration** page:

- **IPv6 Preferred** - if a router is deployed in a mixed environment (IPv4 and IPv6), this option allows user to onboard their device using IPv6
- **Use Management Interface** - in a multi WAN configuration, this option allows the user to choose the management WAN as the channel for cnMaestro communication.

For more information on Onboarding cnPilot Wi-Fi routers, refer to cnMaestro User Guide.

Performing speed test

The cnPilot Home Routers support speed test service and it can be triggered from cnMaestro On-Premises server.

> **Note**
>
> The port that is used for Wi-Fi performance in cnMaestro On-Premises is 18301 (UDP and TCP).

The cnMaestro On-Premises supports the speed test feature from 1.5.1 release onwards. For more information, refer to *Wi-Fi performance* in On-Premises User Guide.

Chapter 3: Advanced Configuration

This chapter guides users to execute advanced (full) configuration through admin mode operation.

This chapter contains the following topics:

- Two-Level Management
- Setting the time zone
- Status
- Configuring the Internet connection
- Custom factory default configuration
- Configuring as Range Extender / Wi-Fi Repeater
- Wireless
- SIP
- FXS1
- FXS2
- Security
- Application
- Administration
- System Log
- Logout
- Reboot

Two-Level Management

This section explains password setup procedure for an administrator or user and adjusting the basic and advanced settings.

cnPilot Home Router supports two-level management: administrator and user. For administrator mode operation, type “admin/admin” on Username/Password and click **Login** to begin configuration. For user mode operation, type “user/user” on Username/Password and click **Login** to begin configuration.

Note

It is highly recommended to change the admin/user passwords to non-default values.

Setting the time zone

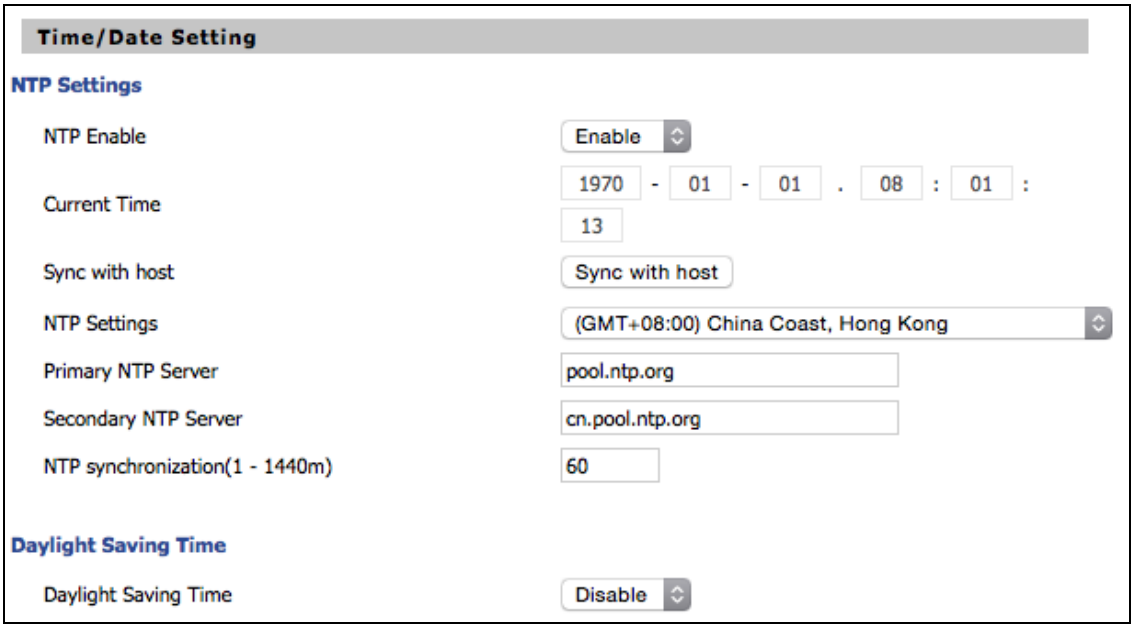
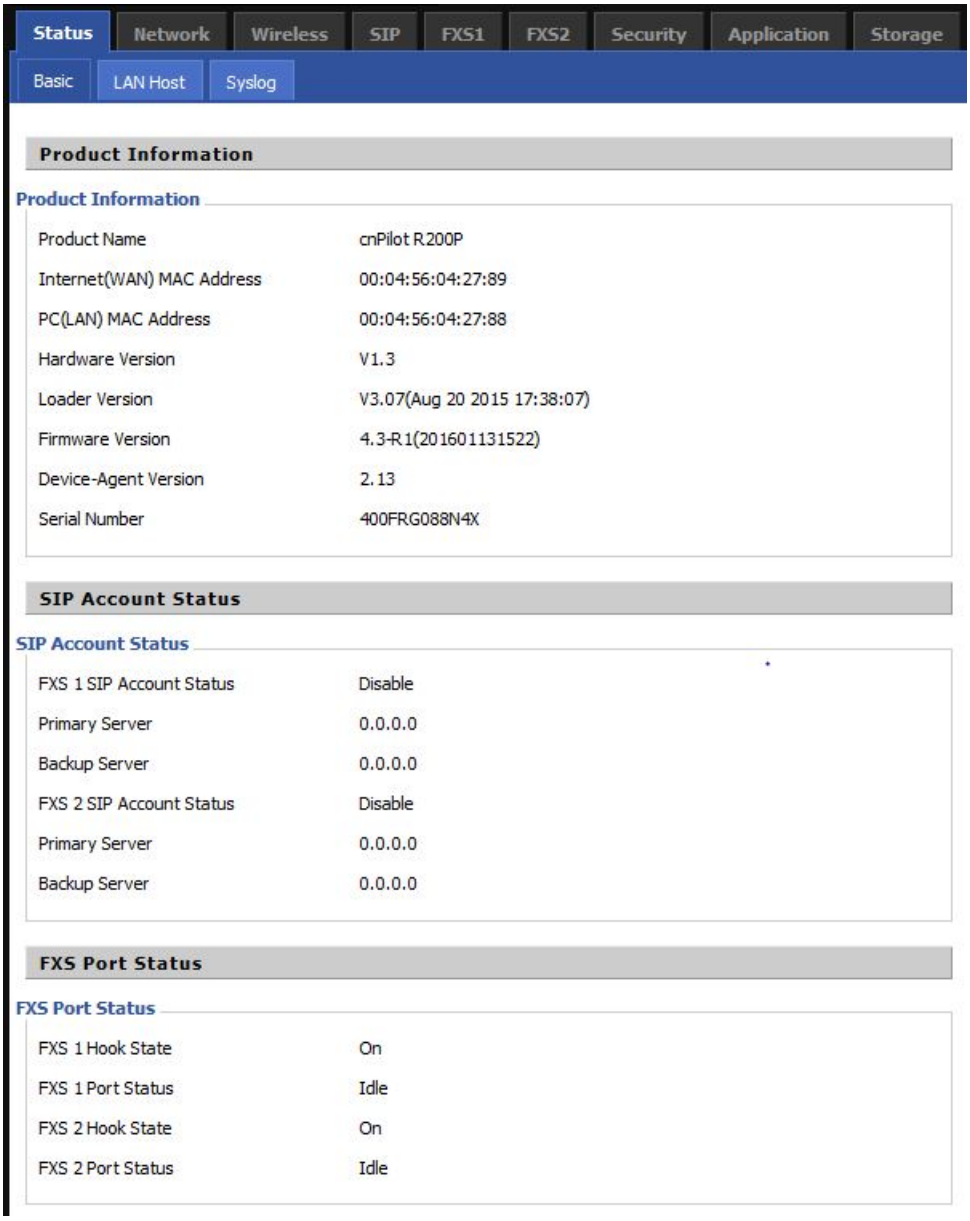
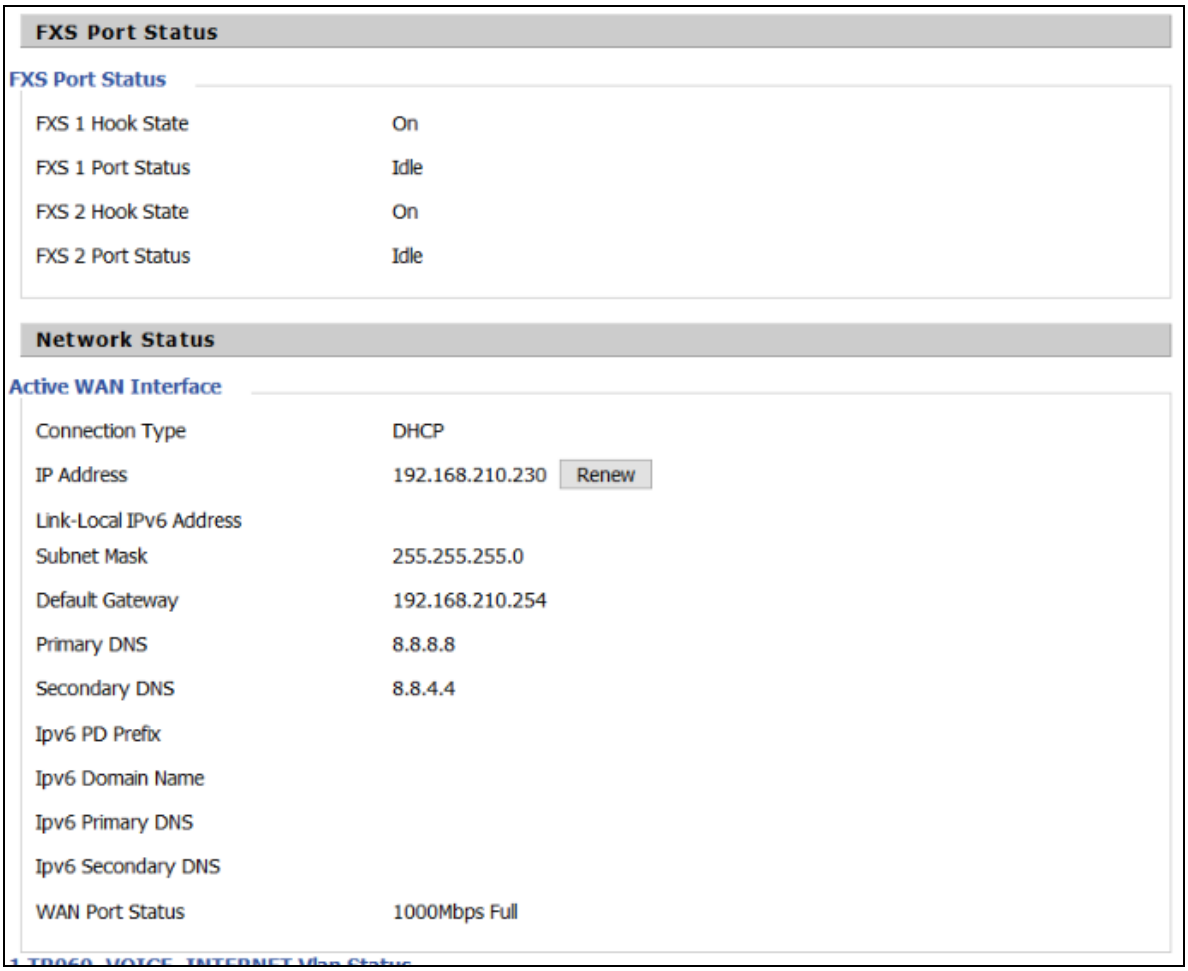


Table 6: Setting time zone

Field Name	Description
NTP Enable	Enable NTP (Network Time Protocol) to automatically retrieve time and date settings for the device.
Current Time	When NTP Enable is set to “Disable”, manually configure the time and date via the Current Time parameter.
Sync with host	Press Sync with host button to synchronize the host PC date, time and time zone.
Primary NTP Server	Primary and secondary NTP server address for clock synchronization. A valid NTP server must be reachable for full NTP functionality.
Secondary NTP Server	
NTP Synchronization (1-1440m)	The synchronization period with NTP (1-1440 minutes), default is 60.

Status


Status
Network
Wireless
SIP
FXS1
FXS2
Security
Application
Storage
Basic
LAN Host
Syslog
Product Information
Product Information
Product Name cnPilot R200P
Internet(WAN) MAC Address 00:04:56:04:27:89
PC(LAN) MAC Address 00:04:56:04:27:88
Hardware Version V1.3
Loader Version V3.07(Aug 20 2015 17:38:07)
Firmware Version 4.3-R1(201601131522)
Device-Agent Version 2.13
Serial Number 400FRG088N4X
SIP Account Status
SIP Account Status
FXS 1 SIP Account Status Disable
Primary Server 0.0.0.0
Backup Server 0.0.0.0
FXS 2 SIP Account Status Disable
Primary Server 0.0.0.0
Backup Server 0.0.0.0
FXS Port Status
FXS Port Status
FXS 1 Hook State On
FXS 1 Port Status Idle
FXS 2 Hook State On
FXS 2 Port Status Idle



FXS Port Status

FXS Port Status

FXS 1 Hook State	On
FXS 1 Port Status	Idle
FXS 2 Hook State	On
FXS 2 Port Status	Idle

Network Status

Active WAN Interface

Connection Type	DHCP
IP Address	192.168.210.230 Renew
Link-Local IPv6 Address	
Subnet Mask	255.255.255.0
Default Gateway	192.168.210.254
Primary DNS	8.8.8.8
Secondary DNS	8.8.4.4
Ipv6 PD Prefix	
Ipv6 Domain Name	
Ipv6 Primary DNS	
Ipv6 Secondary DNS	
WAN Port Status	1000Mbps Full

TR069_VOICE_INTERNET Vlan Status

Connection Type	DHCP
MAC Address	00:04:56:04:27:89
IP Address	10.110.134.15
Subnet Mask	255.255.255.0
Default Gateway	10.110.134.254
Primary DNS	10.110.12.30
Secondary DNS	10.110.12.31

VPN Status

VPN Type	Disable
Initial Service IP	
Virtual IP Address	

LAN Port Status

IP Address	192.168.11.1
Subnet Mask	255.255.255.0
LAN1	Link Down
LAN2	Link Down
LAN3	100Mbps Full
LAN4	Link Down

Wireless Info

Wireless 2.4GHz

Radio On/Off	On
Network Mode	11b/g/n
Current Channel	1
Channel Bandwidth	40MHz

CAMBIUM_2.4GHz_042788

BSSID	00:04:56:04:27:88
Number of Device	0

SSID2

BSSID	00:04:56:04:27:89
Number of Device	0

SSID3

BSSID	00:04:56:04:27:8A
Number of Device	0

SSID4

BSSID	00:04:56:04:27:8B
Number of Device	0

System Status

System Status

Current Time	2016-01-19 05:47:28
Elapsed Time	1 Min

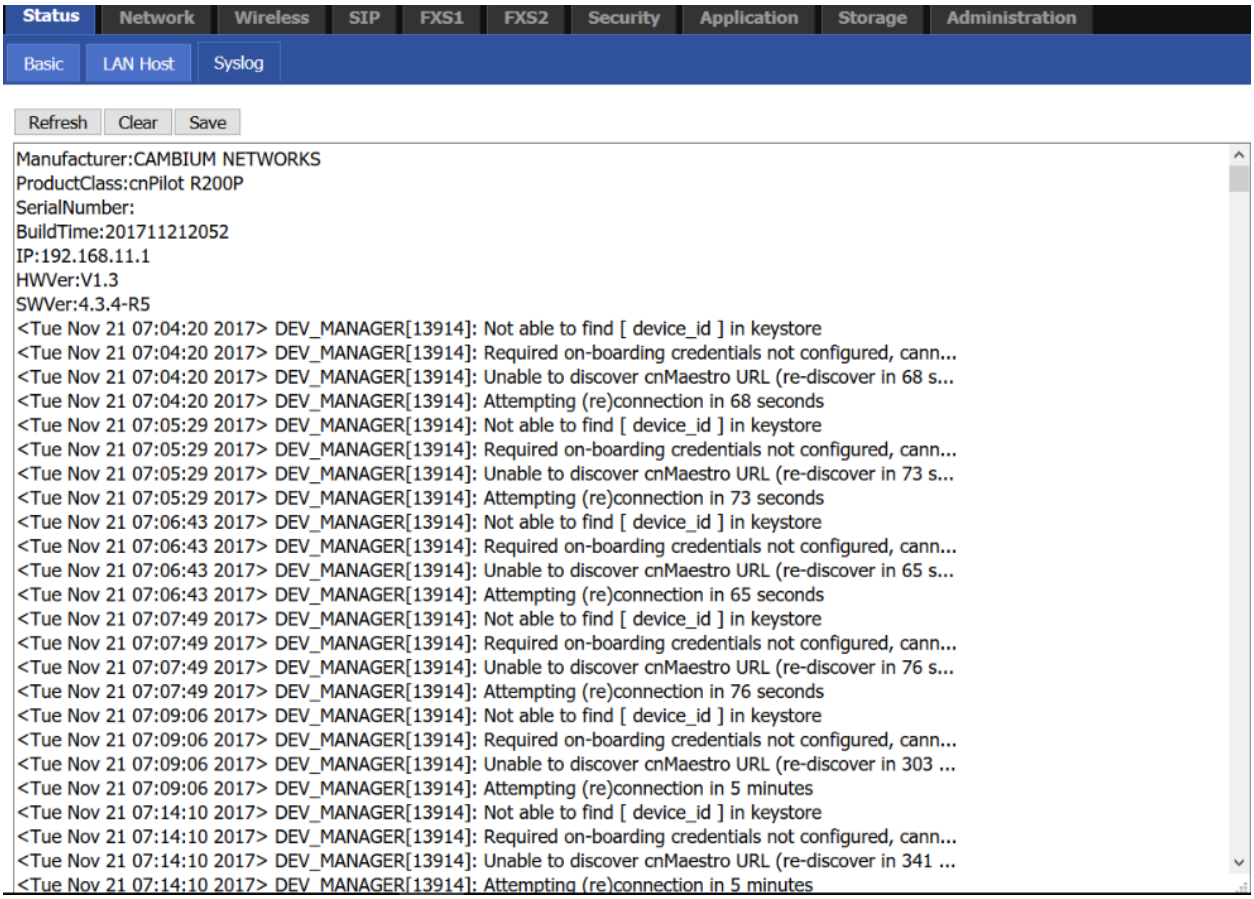


Table 7: Status > Basic Page

Description
This webpage shows the status information about the Product, Network, and System including Product Information, SIP Account Status, FXS Port Status, Network Status and Wireless Info.

Configuring the Internet connection

In **Network > WAN** page, WAN connections may be inserted or deleted. For more information on *Internet Connection setting*, refer to Configuring the Internet connection.

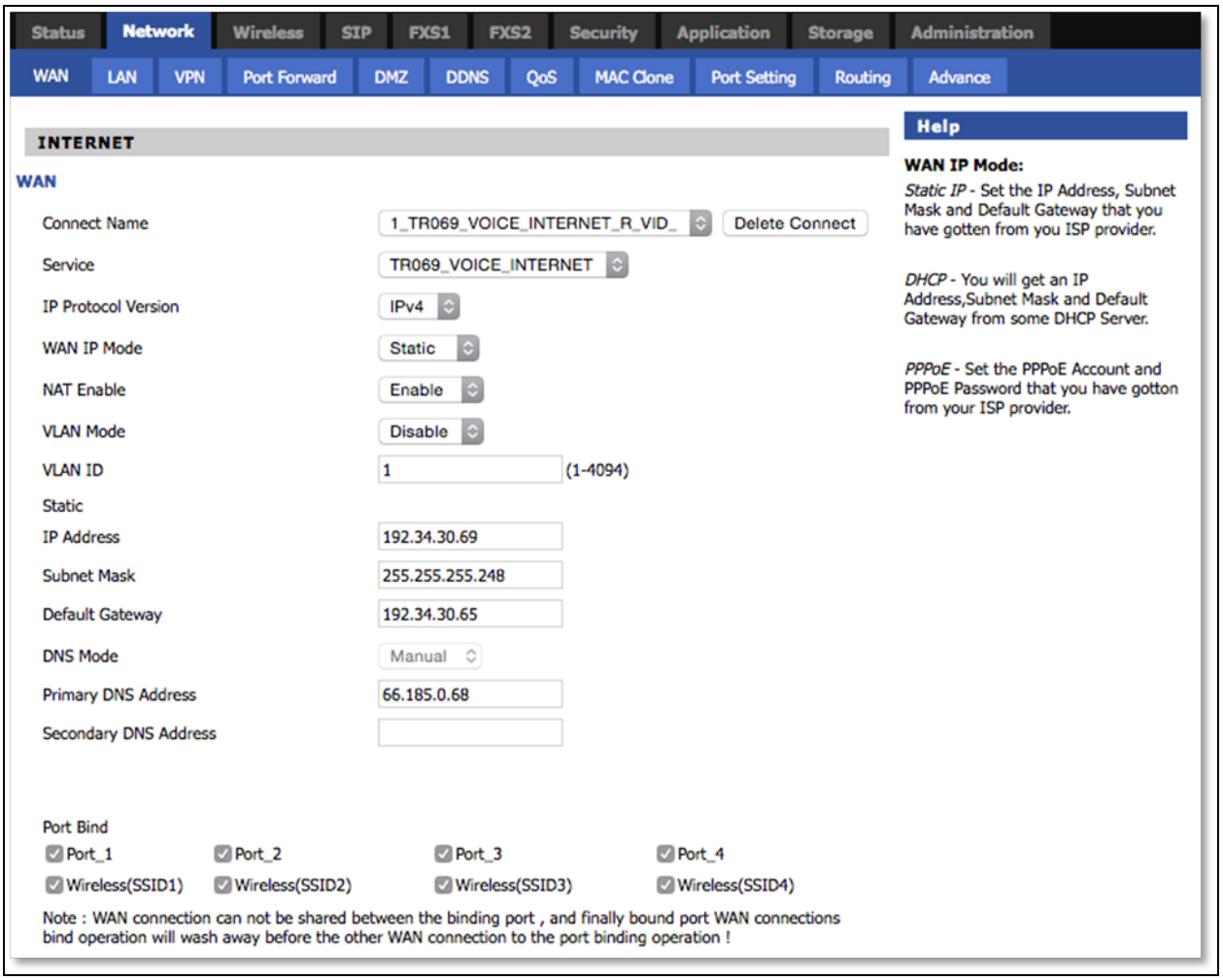


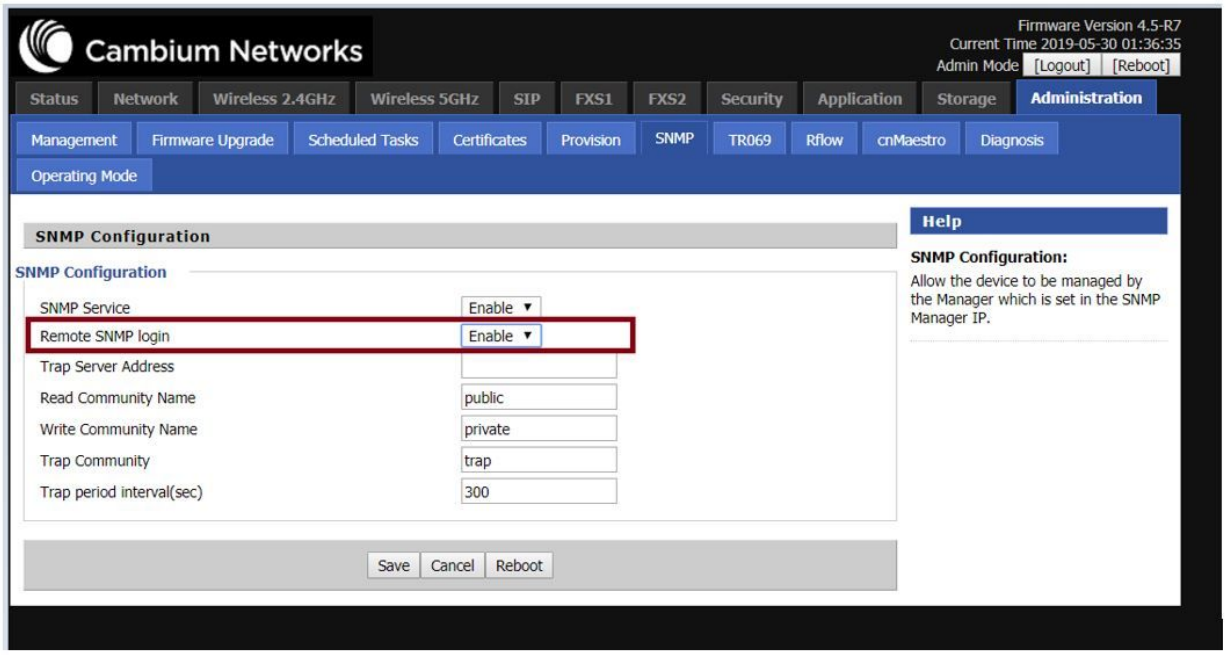
Table 8: Configuring the Internet connection

Field Name	Description
Connect Name	Use keywords to indicate WAN port service model.
Service	Chose the service mode for the created connection.
IP Protocol Version	IPv4 and IPv6 are supported.
WAN IP Mode	Choose Internet connection mode, DHCP, PPPoE, Static or Bridge.
NAT Enable	Enable or disable NAT.
VLAN ID	**Note** Multiple WAN connections may be created with the same VLAN ID.
DNS Mode	Select DNS mode, options are **Auto** and **Manual**: • When DNS mode is Auto, the device under LAN port will automatically obtain the preferred DNS and alternate DNS.

Field Name	Description
	• When DNS mode is Manual, the user should manually configure the preferred DNS and alternate DNS.
Primary DNS	Enter the preferred DNS address.
Secondary DNS	Enter the secondary DNS address.
DHCP	Displayed when WAN IP Mode is set to DHCP.
DHCP Renew	Refresh the DHCP IP.
DHCP Vendor (Option60)	• Specify the DHCP Vendor field. • Display the vendor and product name.

Custom factory default configuration

cnPilot Home Router supports custom factory default configuration. This feature is available from release 4.5-R7 onwards. This feature allows user to generate their own customized default configuration file for the device(s). After the installation, this customized default configuration gets applied to the device each time after the device is factory reset. A TFTP server and SNMP browser are required to configure custom factory default. Recommended tool for TFTP server is **tftpd64** and for SNMP browser is **iReasoning MIB**. This setting can be done from either WAN or LAN. To configure factory default from WAN, select **Enable** from remote **SNMP login** drop-down as shown in following figure.

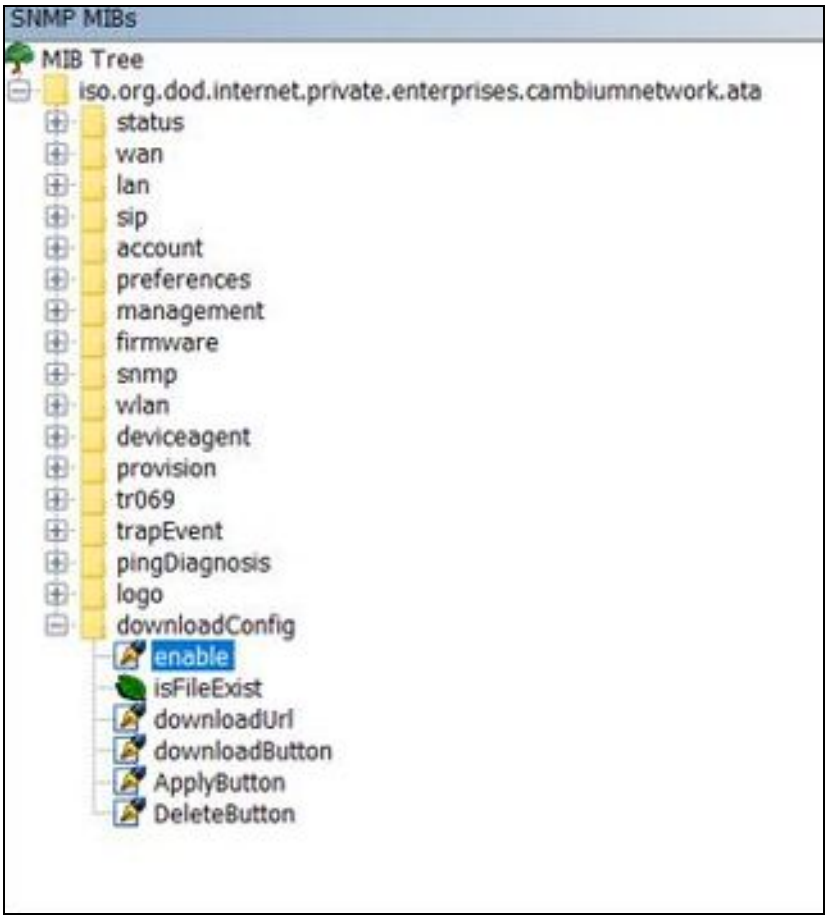


To load the customized default configuration file, perform the following steps:

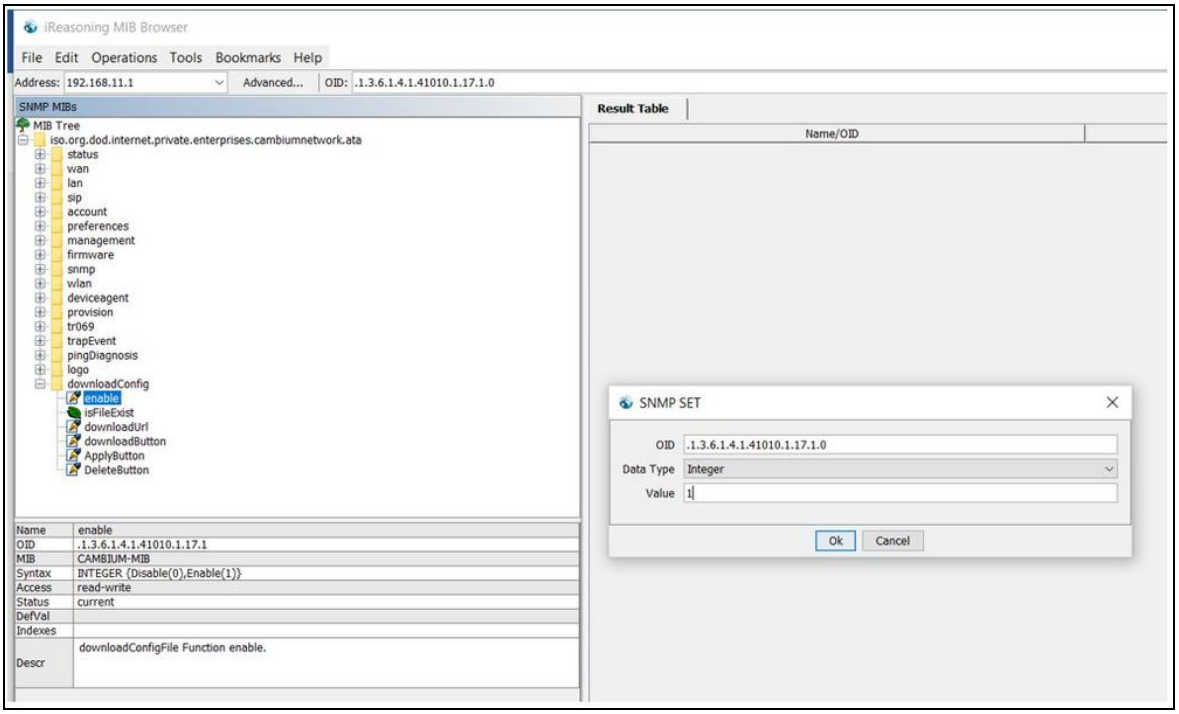
1. Build your customized default configuration file by configuring a router through GUI.
2. Save the configuration and reboot the router.

3. Login to the router and export the configuration.
4. Load the exported configuration file and copy to the TFTP server.

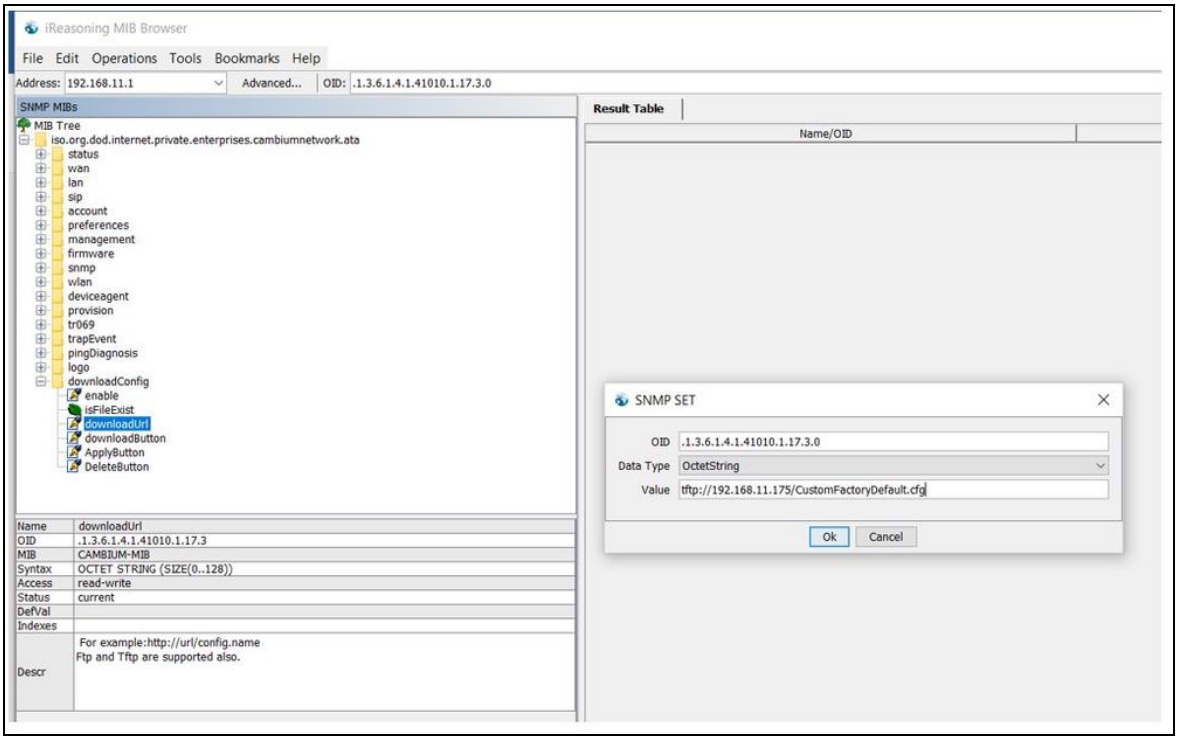
   This becomes the custom defult configuration.
5. Download **cambium-ata-mib** file from [Cambium Networks Support Site](#).
6. Open MIB browser and load **cambium-ata-mib** file.
7. On the left pane, expand **downloadConfig**.



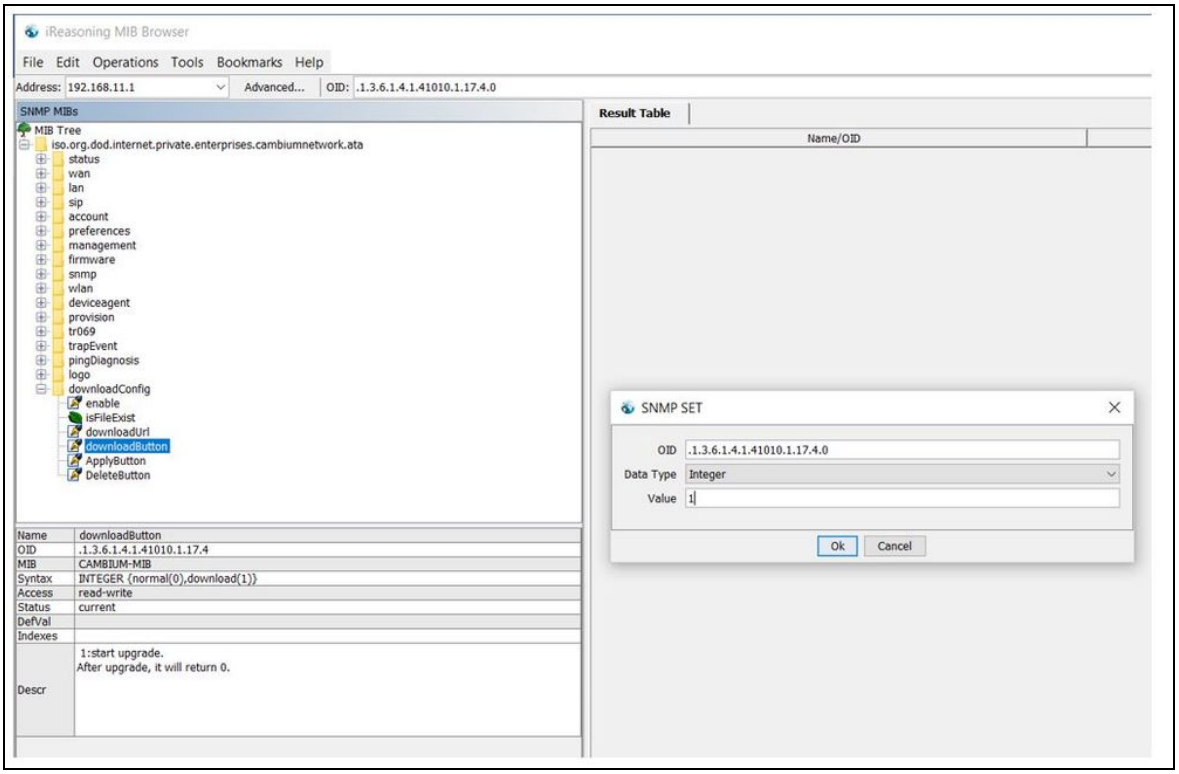
8. Double-click **enable** and type *1* in **value** to enable custom configuration file as factory default configuration.



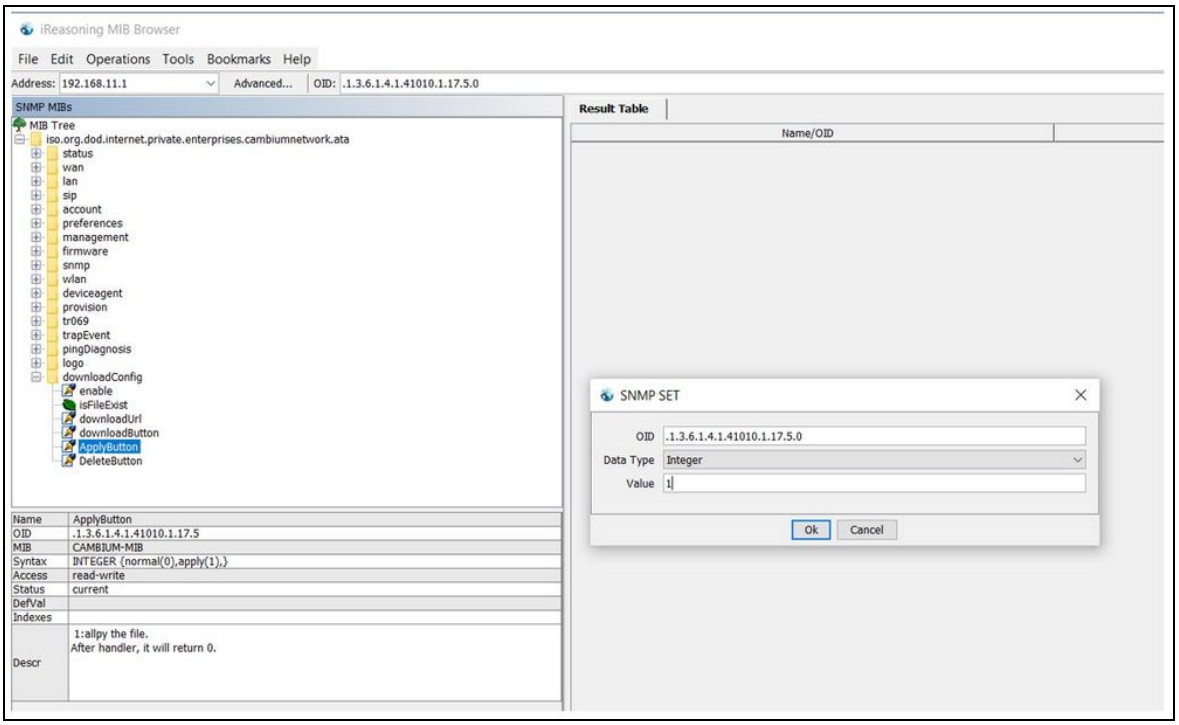
9. Double-click **downloadUrl** and provide the tftp custom configuration file laocation in **Value**.



10. Double-click **downloadButton** and type *1* in **Value**.



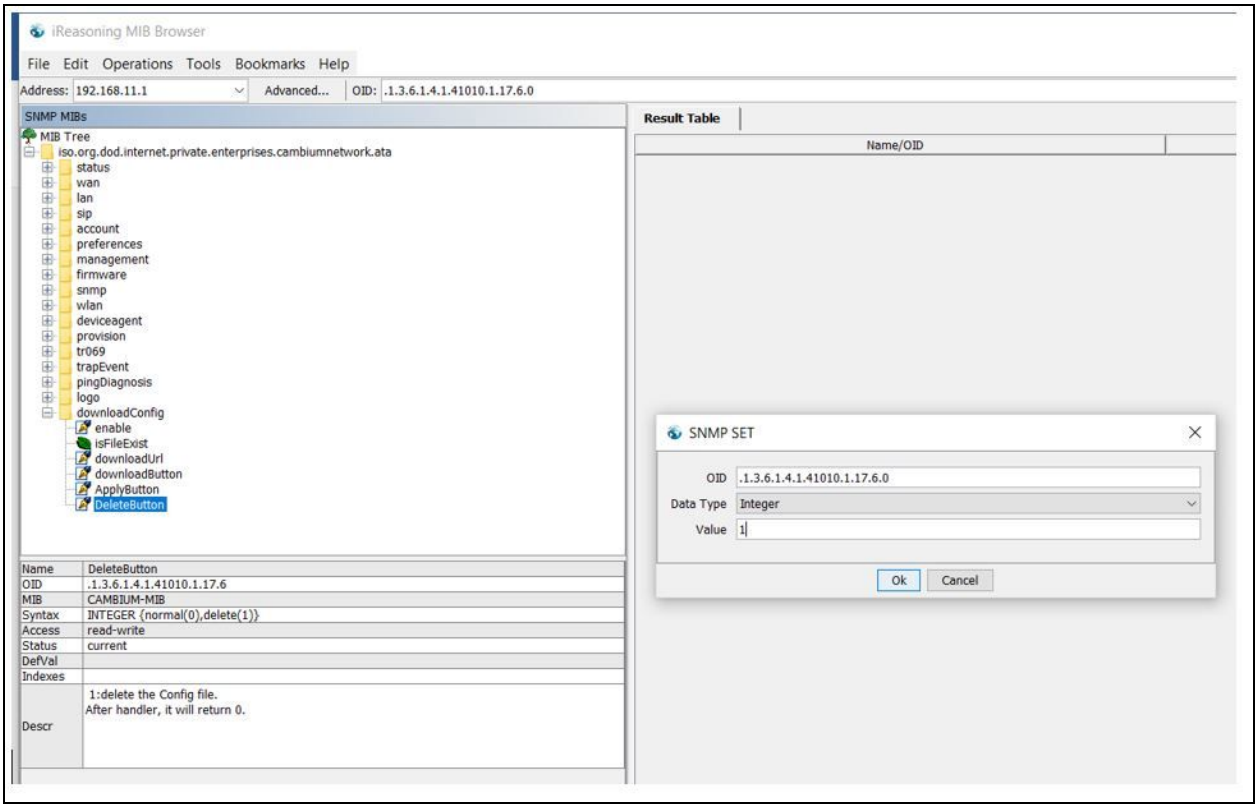
11. Double-click on **ApplyButton** and type *1* in **Value**.



12. Reboot the router.

Router saves this configuration file as default factory settings. After reboot, router starts with this configuration.

To go back to Cambium Networks default factory reset settings, double-click **DeleteButton**, type *1* in **Value** and reboot the router. After reboot, router starts with Cambium Networks default factory reset settings.



Configuring as Range Extender / Wi-Fi Repeater

cnPilot Home Router devices can be configured as wireless repeater and used as range extender. This feature can be used to extend the wireless networks in a big homes or places where the wireless coverage provided by the Base AP to be extended . This feature is also important for small and medium business establishments with only one internet drop point that can be used to connect only one Access Point and using the Repeater functionality internet coverage that can be extended to other areas.

Repeater configuration

The first AP with wired internet link on WAN port is referred to as the **Base AP**. The AP that extends the internet link as a wireless extender, with no physical WAN port connection, is referred to as a **Repeater AP**. The repeater AP connects with base AP over the air. User devices are able to connect to repeater and the base SSIDs.

Base AP configuration for repeater mode

Any cnPilot Home Router AP can act as a base AP and can provide connectivity to another cnPilot Home Router repeater AP. There is no special configuration required on the base AP. Secure PSK based SSID - preferably on 5 GHz and configured with WPA2-PSK that can be used by the extender AP to connect.

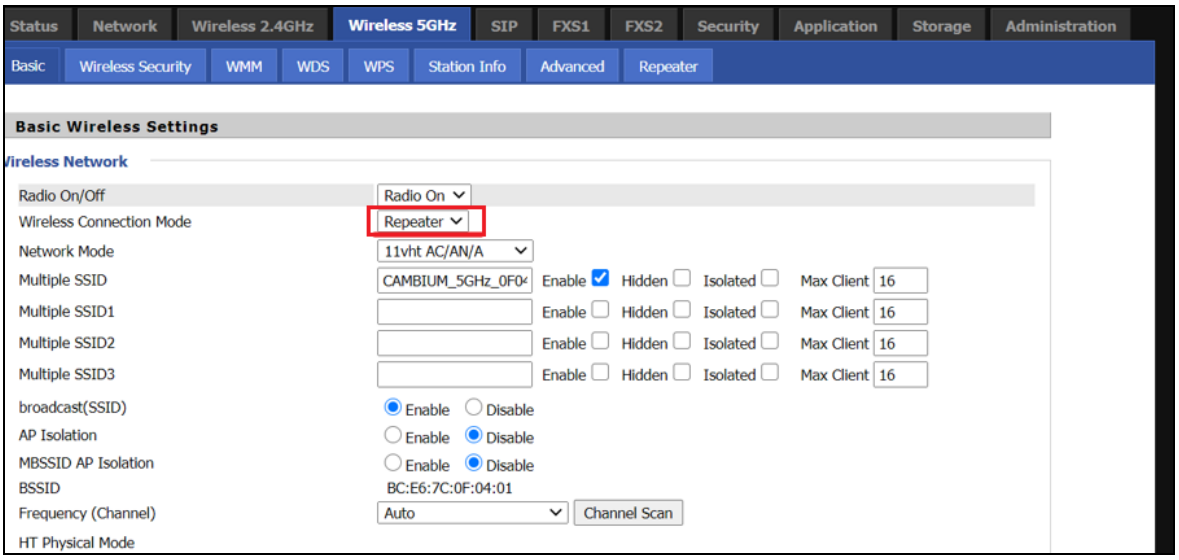
Repeater AP configuration

cnPilot Home Router AP can be configured as Repeater AP and they can connect with the base AP as Wi-Fi extender to increase the coverage of existing base AP's.

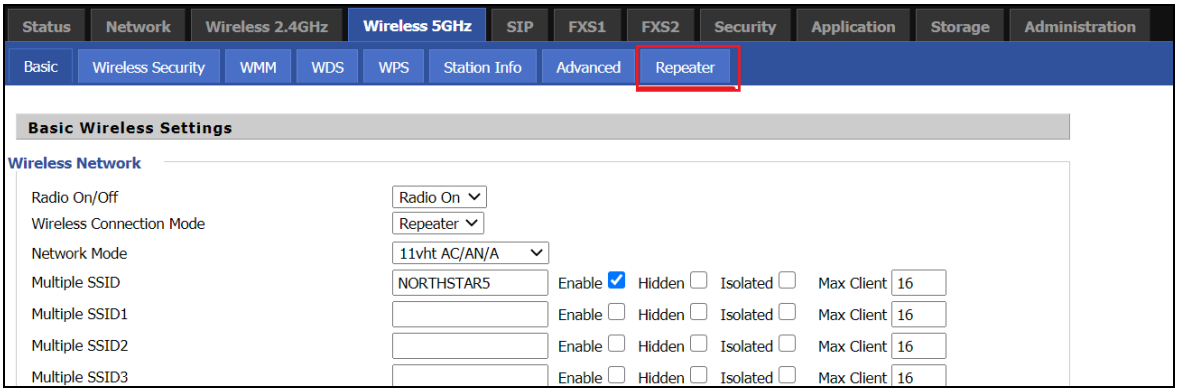
Repeater AP configuration

To configure Repeater AP, perform the following steps:

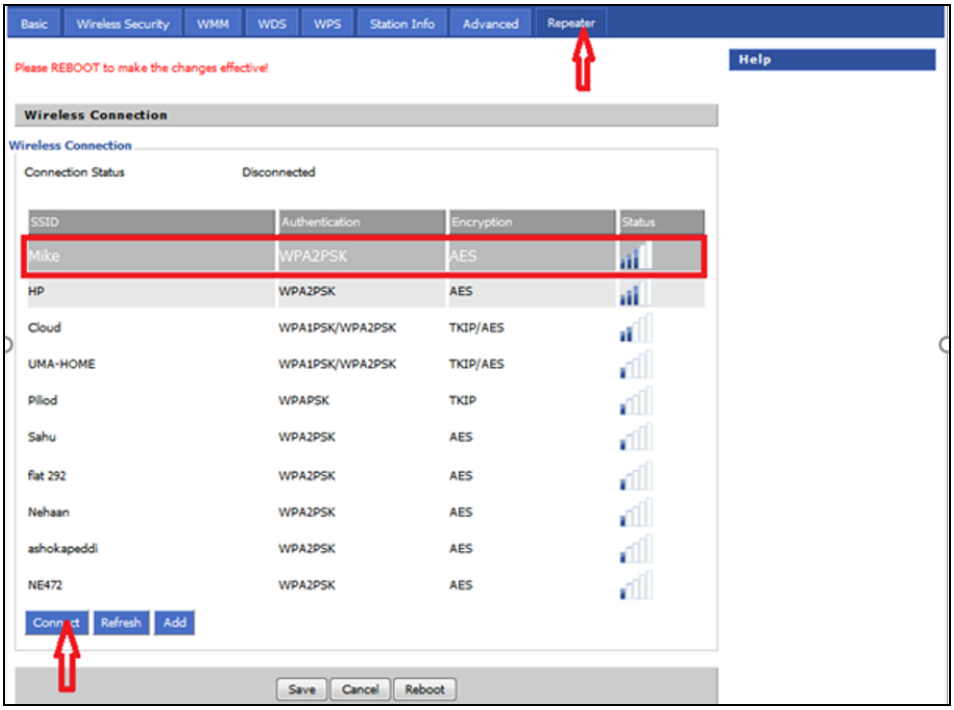
1. Under **Wireless Network**, select **Repeater** from **Wireless Connection Mode** drop-down.



After configuring Wireless Connection Mode as Repeater, a new **Repeater** tab is added in the existing tabs under Wireless 2.4GHz or Wireless 5 GHz where the Repeater mode is selected.

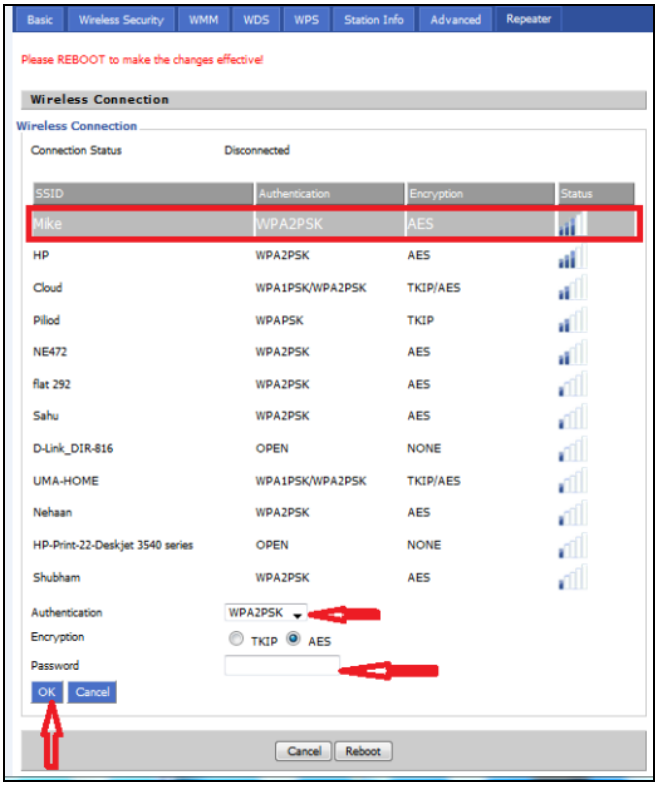


2. Click on the **Repeater** tab and check the available SSIDs with their Authentication and Encryption mode. Select SSID of your Base AP and press **Connect** to initiate the Repeater connection with Base AP.

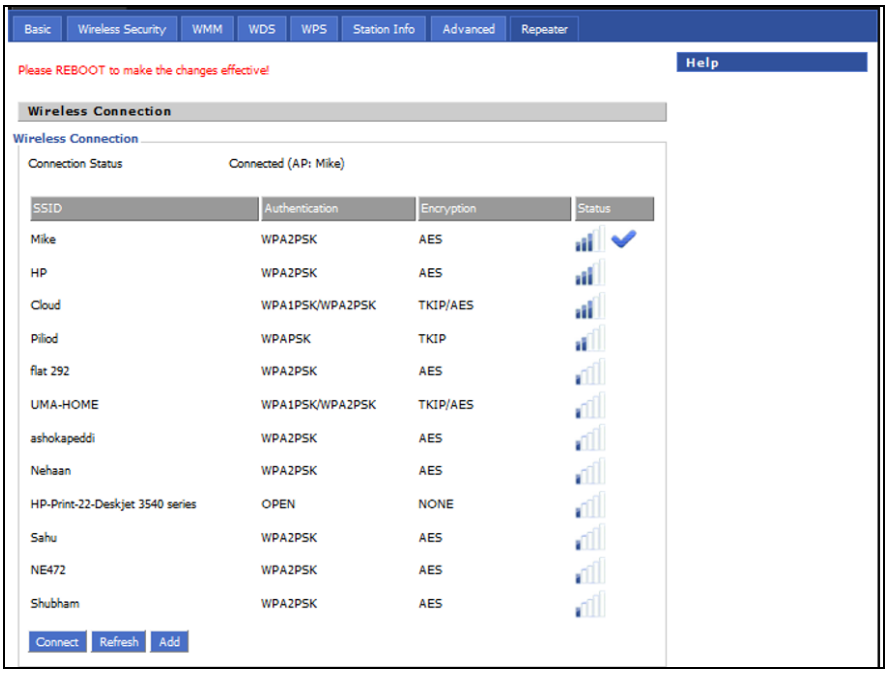


3. After selecting the Base AP SSID in the list of Available SSIDs, click **Connect**, an option to select **Authentication mode**, **Encryption type** and a text box to enter the password for the selected SSID are displayed.

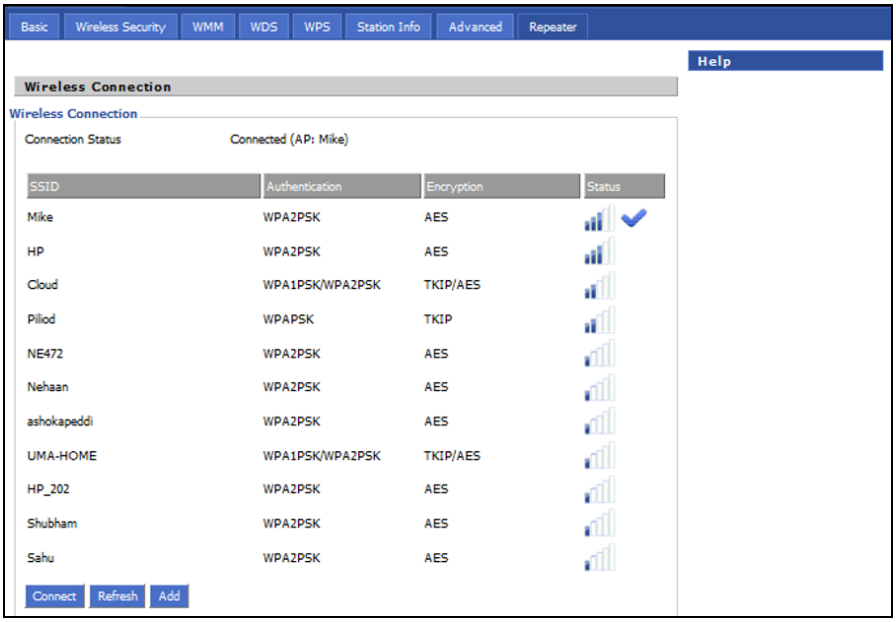
   After entering all the information click **OK** to make the Repeater mode connection with selected SSID.



The Repeater link comes up. Verify the Connection Status as **Connected** and it also shows the name of SSID where it is connected.



4. Click **Save** to save the configurations and reboot the AP. After rebooting the Repeater AP, check that the Repeater Link is up with the Base AP SSID previously selected automatically.



Repeater AP LAN IP/WAN IP changes

If both Base AP and Repeater AP has same LAN IP/range as **192.168.11.xx**, then Repeater AP's LAN IP range automatically changes to **192.168.12.xx** and repeaters LAN IP is 192.168.12.1. Repeater AP's WAN Port/internet port gets IP address from the configured LAN DHCP server of the base AP.

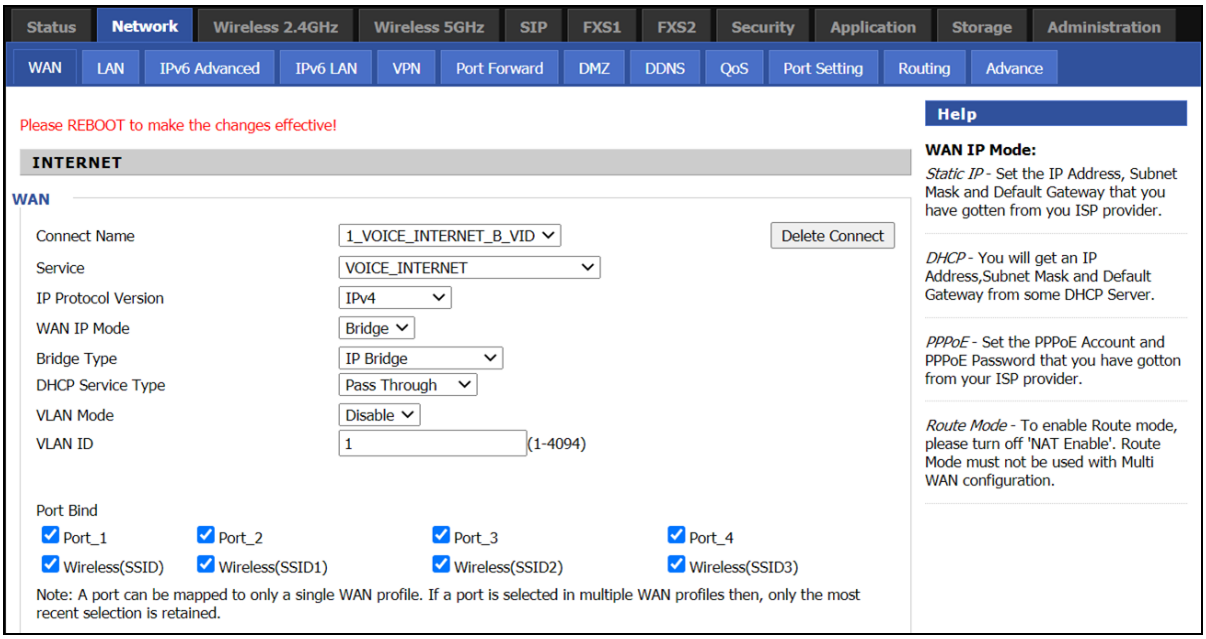
> **Note**
>
> If cnPilot Home Router device is configured as a Repeater, it changes from 192.168.11.x pool on the LAN side to 192.168.12.x pool. This sticks around unless we factory reset the Repeater AP. It is recommended not to swap the Base and Repeater AP configurations across devices. And if that is really required, then the user must factory reset the Repeater AP before using it elsewhere.

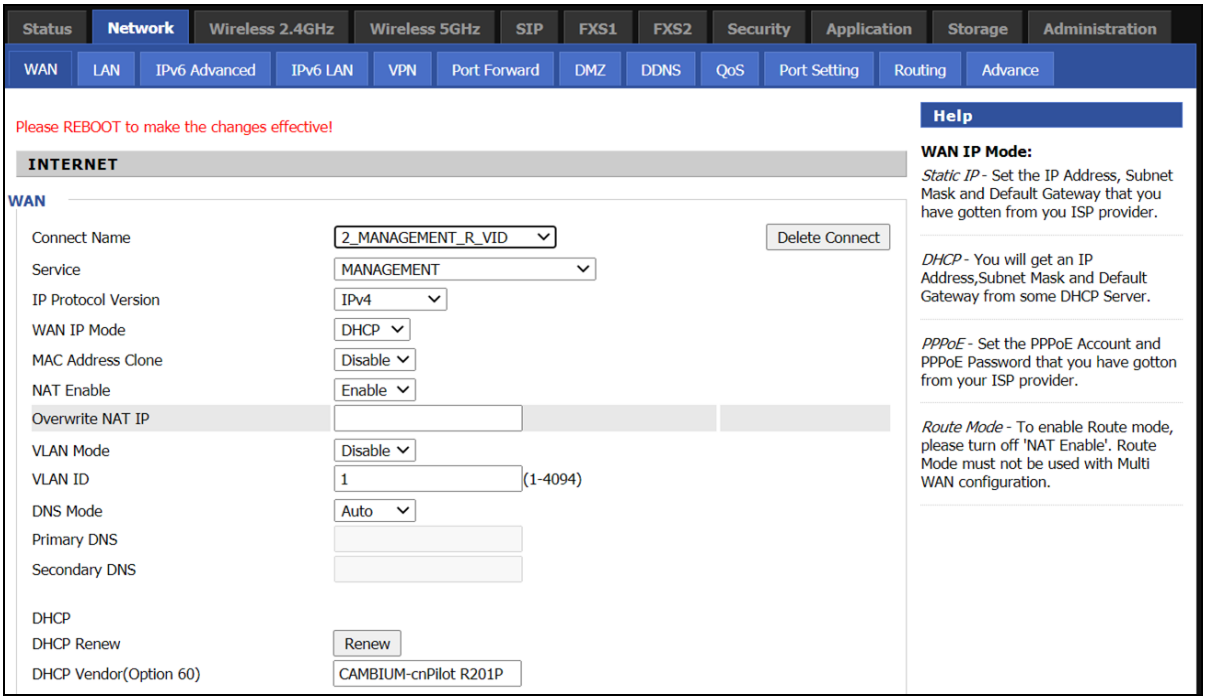
In the above configuration method, the Repeater is in DHCP/NAT mode, hence the wireless client gets 192.168.12.x IP. Only limitation of this method is, any shared network resources, like printers, Sonos, NAS etc must be connected only to the primary/base AP in order to be accessible from all the clients. Clients/Devices connected to the Repeater AP cannot be accessed from client in the primary/base AP.

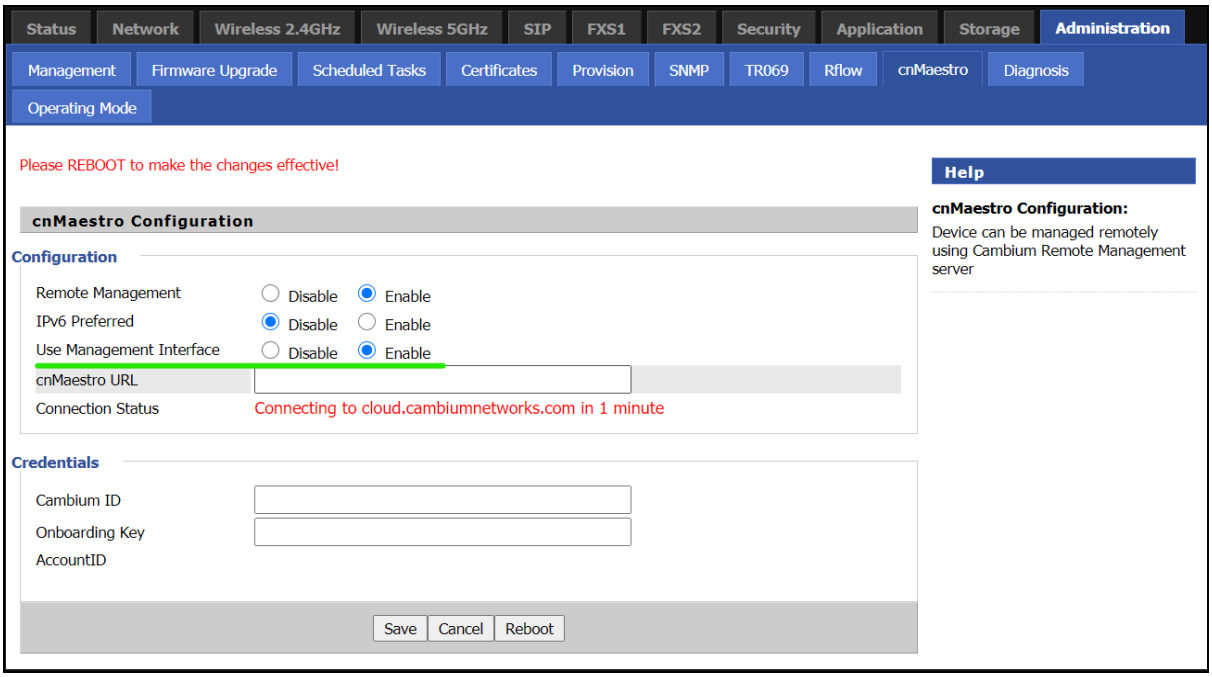
To unify all clients under a single subnet, configure the Repeater AP with 2 WAN profiles:

1. Wan profile 1 : Service: Internet_Voice WAN IP Mode: Bridge
2. Wan profile 2 : Service: Management WAN IP Mode: NAT/DHCP, also enable **Use Management Interface** under **Administration** > **cnMaestro**.

With this configuration all base and repeater's client is in single subnet **192.168.11.x** and able to access share resources.


Status
Network
Wireless 2.4GHz
Wireless 5GHz
SIP
FXS1
FXS2
Security
Application
Storage
Administration
WAN
LAN
IPv6 Advanced
IPv6 LAN
VPN
Port Forward
DMZ
DDNS
QoS
Port Setting
Routing
Advance
Please REBOOT to make the changes effective!
INTERNET
WAN
Connect Name
1_VOICE_INTERNET_B_VID
Delete Connect
Service
VOICE_INTERNET
IP Protocol Version
IPv4
WAN IP Mode
Bridge
Bridge Type
IP Bridge
DHCP Service Type
Pass Through
VLAN Mode
Disable
VLAN ID
1
(1-4094)
Port Bind
Port_1
Port_2
Port_3
Port_4
Wireless(SSID)
Wireless(SSID1)
Wireless(SSID2)
Wireless(SSID3)
Note: A port can be mapped to only a single WAN profile. If a port is selected in multiple WAN profiles then, only the most recent selection is retained.
Help
WAN IP Mode:
Static IP - Set the IP Address, Subnet Mask and Default Gateway that you have gotten from you ISP provider.
DHCP - You will get an IP Address,Subnet Mask and Default Gateway from some DHCP Server.
PPPoE - Set the PPPoE Account and PPPoE Password that you have gotton from your ISP provider.
Route Mode - To enable Route mode, please turn off 'NAT Enable'. Route Mode must not be used with Multi WAN configuration.


Status
Network
Wireless 2.4GHz
Wireless 5GHz
SIP
FXS1
FXS2
Security
Application
Storage
Administration
WAN
LAN
IPv6 Advanced
IPv6 LAN
VPN
Port Forward
DMZ
DDNS
QoS
Port Setting
Routing
Advance
Please REBOOT to make the changes effective!
INTERNET
WAN
Connect Name
2_MANAGEMENT_R_VID
Delete Connect
Service
MANAGEMENT
IP Protocol Version
IPv4
WAN IP Mode
DHCP
MAC Address Clone
Disable
NAT Enable
Enable
Overwrite NAT IP
VLAN Mode
Disable
VLAN ID
1
(1-4094)
DNS Mode
Auto
Primary DNS
Secondary DNS
DHCP
DHCP Renew
Renew
DHCP Vendor(Option 60)
CAMBIUM-cnPilot R201P
Help
WAN IP Mode:
Static IP - Set the IP Address, Subnet Mask and Default Gateway that you have gotten from you ISP provider.
DHCP - You will get an IP Address,Subnet Mask and Default Gateway from some DHCP Server.
PPPoE - Set the PPPoE Account and PPPoE Password that you have gotton from your ISP provider.
Route Mode - To enable Route mode, please turn off 'NAT Enable'. Route Mode must not be used with Multi WAN configuration.



Repeater mode best practices

1. If both Base AP and Repeater AP are dual band, then configure the Repeater AP to connect on 5 GHz and provide Client Connectivity or User Wireless Connectivity on 2.4 GHz/5 GHz.
2. Place the Repeater AP well within the range of the Base AP for a stable Repeater link.
3. The same radio on the Repeater AP, can be used to connect to the Base AP as extender and provide Wireless User Connectivity also. However with reduced bandwidth available for user traffic.
4. Creating multi hops of Repeater mode degrades performance, increase latency and it is not recommended.

Network

You can configure the WAN port, LAN port, DDNS, Multi WAN, DMZ, MAC Clone, Port Forward and other parameters in this section of the web management interface.

WAN

This page allows you to set WAN configuration with different modes. Use the **Connection Type** drop-down menu to choose one WAN mode and then the corresponding page is displayed.

> **Note**
>
> By default, Management access over WAN is disabled for security concerns and can be enabled if required. For more information, refer to Enabling Mangement access for wireless clients.
>
> By default, SNMP access over WAN interface is disabled for security concerns and can be enabled if required. For more information, refer to Enabling SNMP access over WAN.

WAN settings

The following Table 9 shows the WAN settings information.

Table 9: Connect name

Content	Define	Description
Connect Name	1_MANAGEMENT_ VOICE_INTERNET_R_ VID	WAN Connection name.
Delete Connect		To delete the selected connection name.
Service	VOICE	The connection solely supports VOICE service.
	MANAGEMENT	The connection supports management applications i.e. TR069, WEB, SNMP and Provision.
	INTERNET	The connection solely supports internet service.
	MANAGEMENT_ INTERNET	The connection supports management and internet applications.
	MANAGEMENT_VOICE	The connection supports management and voice applications.
	VOICE_INTERNET	The connection supports voice and internet applications.
	MANAGEMENT_ VOICE_INTERNET	The connection supports management, voice and internet applications.
	Other	The connection support STB (Set Top Box).
IP Protocol Version	IPv4	Use protocol version Ipv4 for WAN Interface.
	Ipv6	Use protocol version Ipv6 for WAN Interface.
WAN IP Mode	STATIC	Set the IP address, Subnet Mask and Default Gateaway from ISP provider.
	DHCP	Provides IP address, Subnet Mask and Default Gateaway from DHCP server.
	PpoE	Set the PpoE account and PpoE password received from ISP provider.
	Bridge	To enable Route Mode, please turn off 'NAT Enable'. Route Mode must not be used with Multi WAN Configuration.
MAC Address Clone		Clone third party device MAC Address.
NAT Enable		Enable Network Address Translation.
Owerwrite NAT IP	<IP Address>	Overwrite NAT IP with given IP.

Content	Define	Description
VLAN Mode	Enable	Enable VLAN Mode.
	Trunk	Enable Trunk.
VLAN ID	1-4094	Specify required VLAN ID.
DNS Mode	Manual	Configure DNS servers manually.
	Auto	Configure DNS servers automatically.
DHCP Renew		Renew your DHCP IP.
DHCP Vendor (Option 60)		Configure required DHCP Vendor Class name.
Port Bind	LAN 1-4	Bind 1 or more LAN ports to the INTERNET WAN profile.
	SSID 1-4	Bind 1 or more SSIDs to the INTERNET WAN profile.

For example:

1_TR069_R_VID_2 (First Interface, Service is TR069, NAT Mode, VLAN ID is 2).

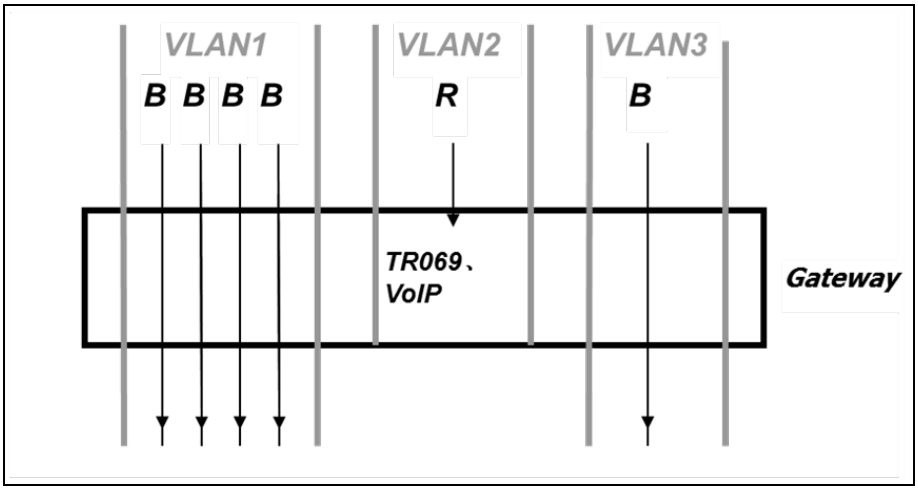
2_INTERNET_B_VID (Second Interface, Service is INTERNET, Bridge Mode, VLAN is disabled).

Overview

Multi WAN is used to implement the distribution of different kinds of services, and device's Multi WAN supports the distribution of data services, voice services and management services. By setting different VLANs, different kinds of data is distributed to the corresponding networks.

For example, INTERNET and Other VLAN supports data transmission, VOICE VLAN supports voice transmission and TR069 VLAN supports WEB, Telnet and TR069 services transmission.

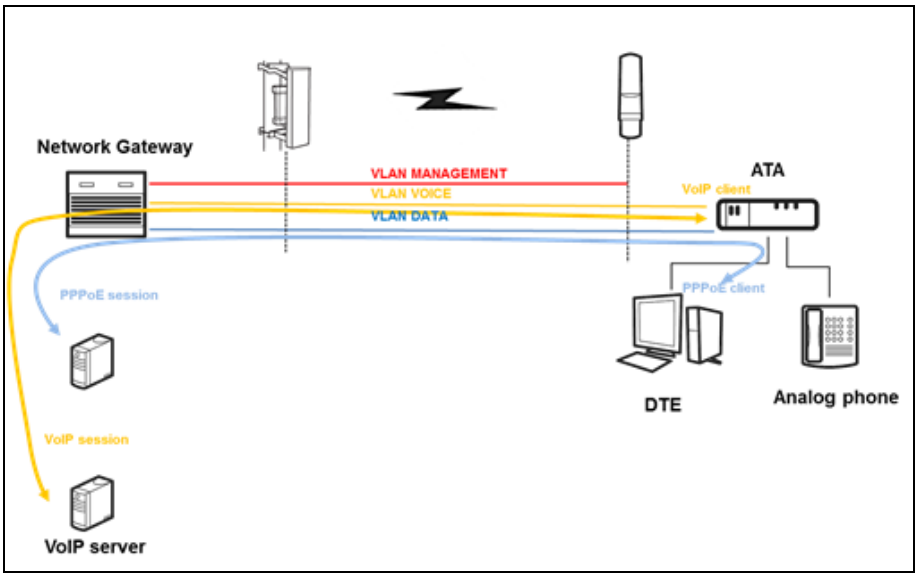
Figure 6: *Multi VLAN*



There following are the advanced functions available when using multi WAN setting:

- PPPoE Bridge allows PPPoE-only packets to pass, which can prohibit Layer 2 packets from flooding the device LAN ports.
- Hardware Bridge operates as a Layer 2 Switch to increase throughput between WAN and LAN.
- VLAN Trunk allows tagged packets to be switched to LAN ports directly.
- IPTV may be supported with other VLAN-configured LAN ports.
- Multiple WAN link (i.e. Connect Name) can be configured with same VLAN ID.

Figure 7: *Multi WAN network*



Change in Port Binding behaviour

Starting from the version 4.4 of the Cambium Networks cnPilot Home Router software, the port binding feature is introduced. This change requires, that users creating non-default WAN INTERNET profiles, must explicitly select/bind one or more LAN ports and/or SSIDs, to the created INTERNET WAN profile as per need. Software before 4.4 had an issue, where in such situations all ports/WLANs were automatically bound to such an INTERNET WAN profile created by the users.

Users running 4.3.4 or lower software and upgrading to 4.4 or newer software, MUST ensure that they update their port binding configuration by explicitly selecting one or more LAN ports and/or SSIDs, before upgrading, to avoid problems related to Internet access from LAN/WLAN clients.

Customers using default WAN profile remain unaffected. Also, customers using non-default WAN profile who have explicitly bound their required LAN ports and/or SSIDs to their INTERNET WAN profile experiences no problems after upgrade.

When creating a new INTERNET WAN profile, select one or more LAN ports and/or SSIDs as shown below Figure 8.

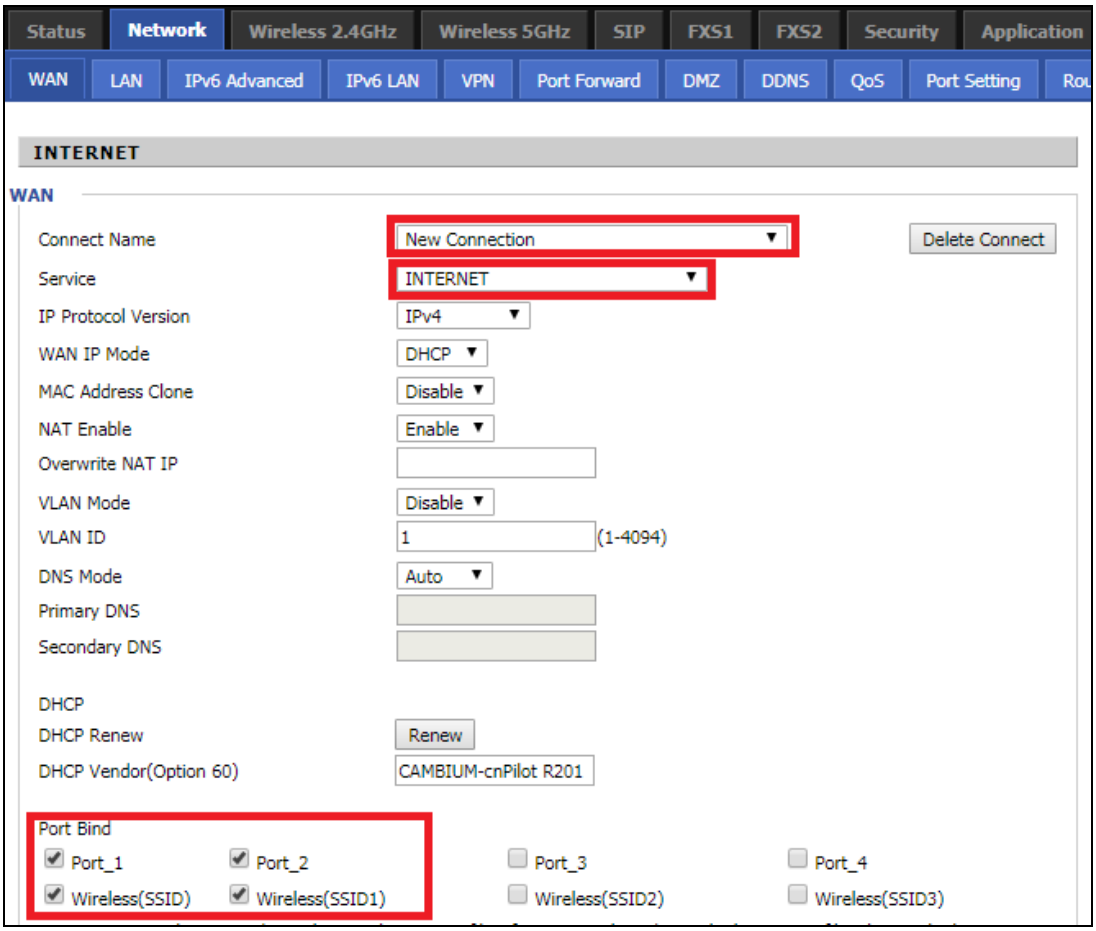
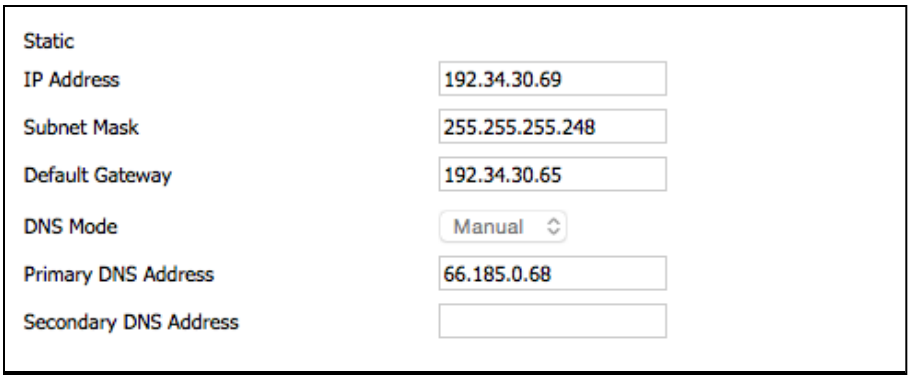


Figure 8: *Port Binding behaviour*

Static IP

This configuration is used when a user receives a fixed public IP address or a public subnet, namely multiple public IP addresses from the Internet providers. A Cable service provider offers a fixed public IP, while a DSL service provider offers a public subnet. If you have a public subnet, you can assign an IP address to the WAN interface.

Table 10: Internet



Name	Definition
IP Address	The IP address of Internet port.
Subnet Mask	The subnet mask of Internet port.
Default Gateway	The default gateway of Internet port.
DNS Mode	Select DNS mode, options are Auto and Manual.
Primary DNS Address	The primary DNS address of Internet port.
Secondary DNS Address	The secondary DNS address of Internet port.

DHCP

The DHCP feature allows the cnPilot Home Router to obtain an IP address automatically from a DHCP server. In this case, it is not necessary to assign an IP address to the client manually.

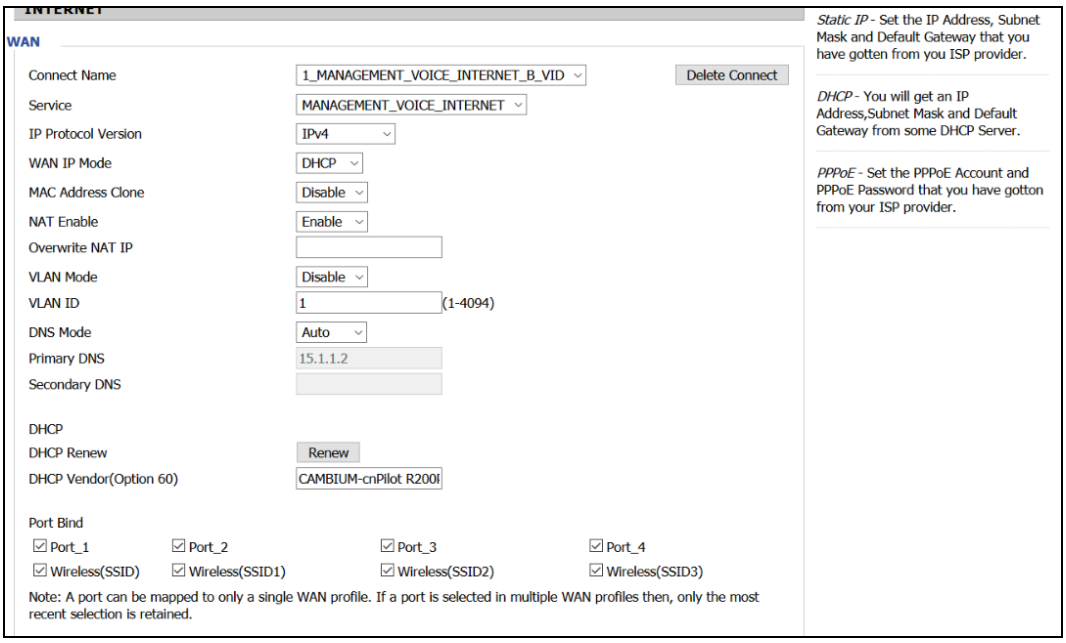


Figure 9: *DHCP*

Table 11: DHCP

Field Name	Description
DNS Mode	Select DNS mode, options are Auto and Manual.
Primary DNS Address	Primary DNS of Internet port.
Secondary DNS Address	Secondary DNS of Internet port.
DHCP Renew	Refresh the DHCP IP address.
DHCP Vendor (Option60)	Specify the DHCP Vendor field. Display the vendor and product name.

PPPoE

PPPoE is Point-to-Point Protocol over Ethernet. It relies on two widely accepted standards: PPP and Ethernet. It connects users through an Ethernet to the Internet with a common broadband medium, such as a single DSL line, wireless device or cable modem. All the users over the Ethernet can share a common connection.

PPPoE is used for most of DSL modem users. All local users can share one PPPoE connection for accessing the Internet. Your service provider will provide you information about username, password, and authentication mode.

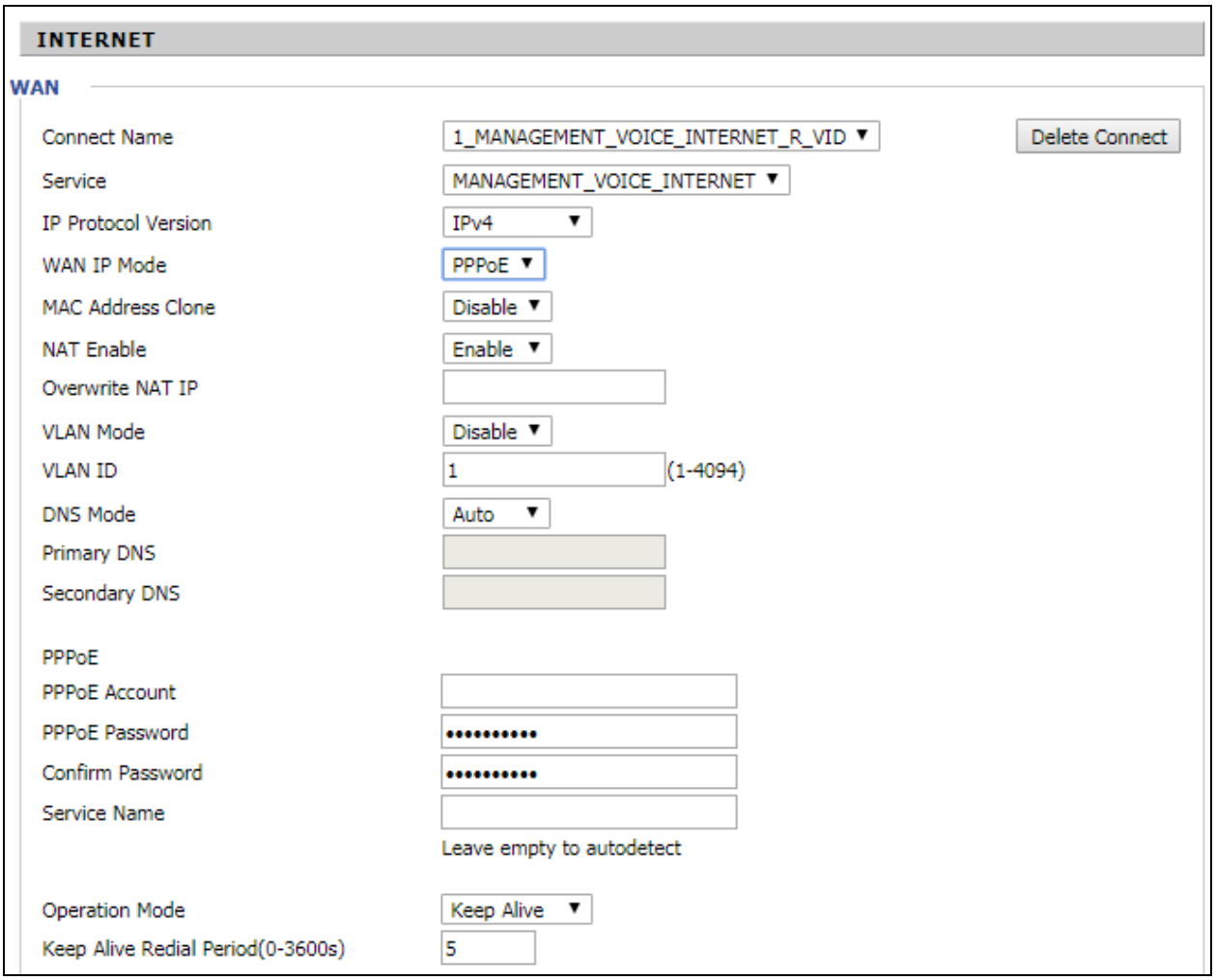


Figure 10: *PPPoE*

Table 12: PPPoE

Field Name	Description
PPPoE Account	Enter a valid username provided by the ISP.
PPPoE Password	Enter a valid password provided by the ISP.
Confirm Password	Enter your PPPoE password again.

Field Name	Description
Service Name	Enter a service name for PPPoE authentication. If it is left empty, the service name is auto detected.
Operation Mode	Select the mode of operation, options are Keep Alive, On Demand and Manual: • When the mode is Keep Alive, the user sets the 'keep alive redial period' values range from 0 to 3600s, the default setting is 5 minutes; • When the mode is On Demand, the user sets the 'on demand idle time' value in the range of 0-60 minutes, the default setting is 5 minutes; Operation Mode: On Demand On Demand Idle Time(0-60m): 5 • When the mode is manual, there are no additional settings to configure.
Keep Alive Redial Period	Set the interval to send Keep Alive messaging.

Bridge mode

The Bridge mode under Multi WAN is different with traditional bridge settings. Bridge mode employs no IP addressing and the device operates as a bridge between the WAN port and the LAN port. Route Connection must be built to give IP address to local service on device.

Following is an example of bridge mode:

1. TR069_VOICE_INTERNET_R_VID_ is router connection for local service.
2. Other_B_VID_ is bridge connection for host of LAN port.

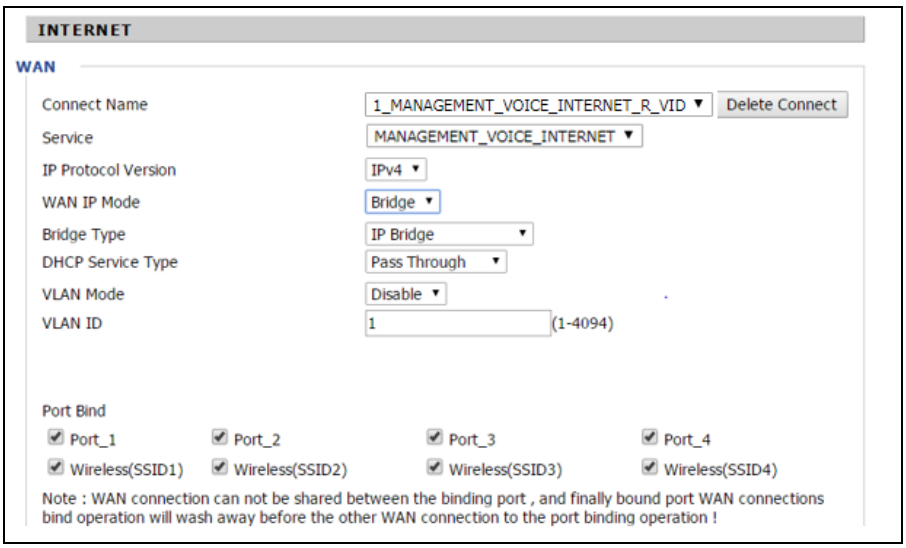


Figure 11: *Bridge mode*

Table 13: Bridge Mode

Field Name	Description
Bridge Type	
IP Bridge	Allows all Ethernet packets to pass. PC can connect to upper network directly.
PPPoE Bridge	Only Allow PPPoE packets pass. PC needs PPPoE dial-up software.
Hardware IP Bridge	Packets pass through hardware switch with wired speed. Does not support wireless port binding.
DHCP Service Type	
Pass Through	DHCP packets can be forwarded between WAN and LAN, DHCP server in gateway will not allocate IP to clients of LAN port.
DHCP Snooping	When gateway forwards DHCP packets form LAN to WAN it will add option82 to DHCP packet, and it will remove option82 when forwarding DHCP packet from the WAN interface to the LAN interface. Local DHCP service will not allocate IP to clients of LAN port.
Local Service	Gateway will not forward DHCP packets between LAN and WAN, it also blocks DHCP packets from the WAN port. Clients connected to the LAN port can get IP from DHCP server run in gateway.
VLAN Mode	
Disable	The WAN interface is untagged. LAN is untagged.
Enable	The WAN interface is tagged. LAN is untagged.
Trunk	Only valid in bridge mode. All ports, including WAN and LAN, belong to this VLAN Id and all ports are tagged with this VLAN id. Tagged packets can pass through WAN and LAN.
VLAN ID	Set the VLAN ID. **Note** Multiple WAN connections may be created with the same VLAN ID.
802.1p	Set the priority of VLAN, Options are 0~7.

Q-in-Q

Q-in-Q tunneling allows service providers to create a Layer 2 Ethernet connection between two customer sites. Providers can segregate different customers' VLAN traffic on a link (for example, if the customers use overlapping VLAN IDs) or bundle different customer VLANs into a single service VLAN. Data centers can use Q-in-Q tunneling to isolate customer traffic within a single site or to enable customer traffic flows between cloud data centers in different geographic locations. Q-in-Q tunneling adds a service VLAN tag (802.1Q based) before the customer's 802.1Q VLAN tags.

In Q-in-Q tunneling, as a packet travels from a customer VLAN (C-VLAN) to a service provider's or data center VLAN (S-VLAN), another 802.1Q tag for the appropriate S-VLAN is added before the C-VLAN tag.

The C-VLAN tag remains and is transmitted through the network. As the packet leaves the S-VLAN in the downstream direction, the S-VLAN 802.1Q tag is removed.

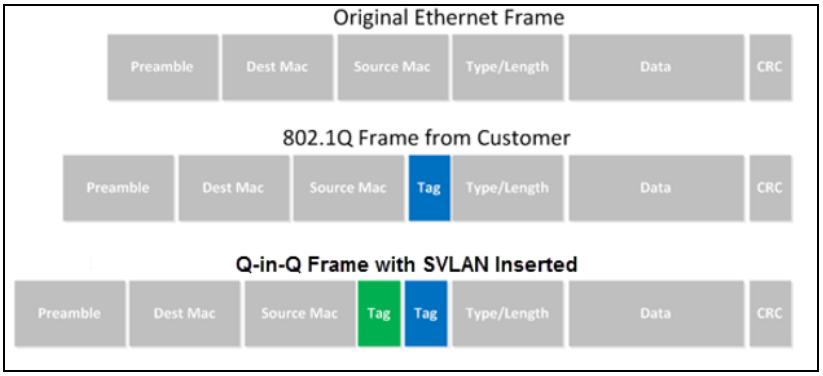
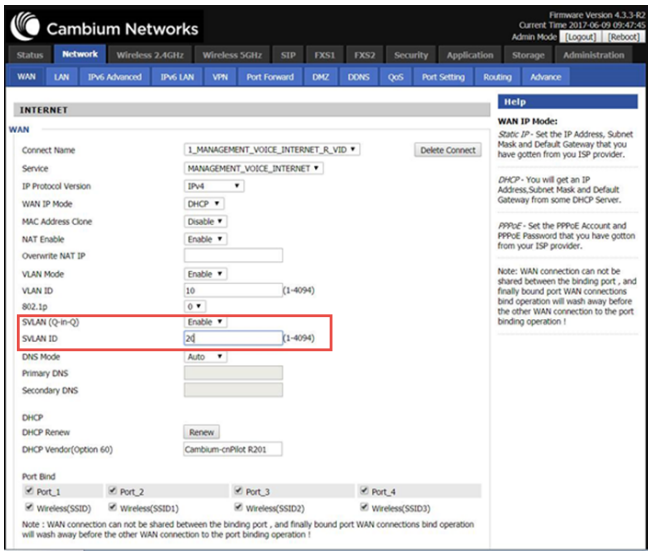


Figure 12: *Q-in-Q Frame Format*

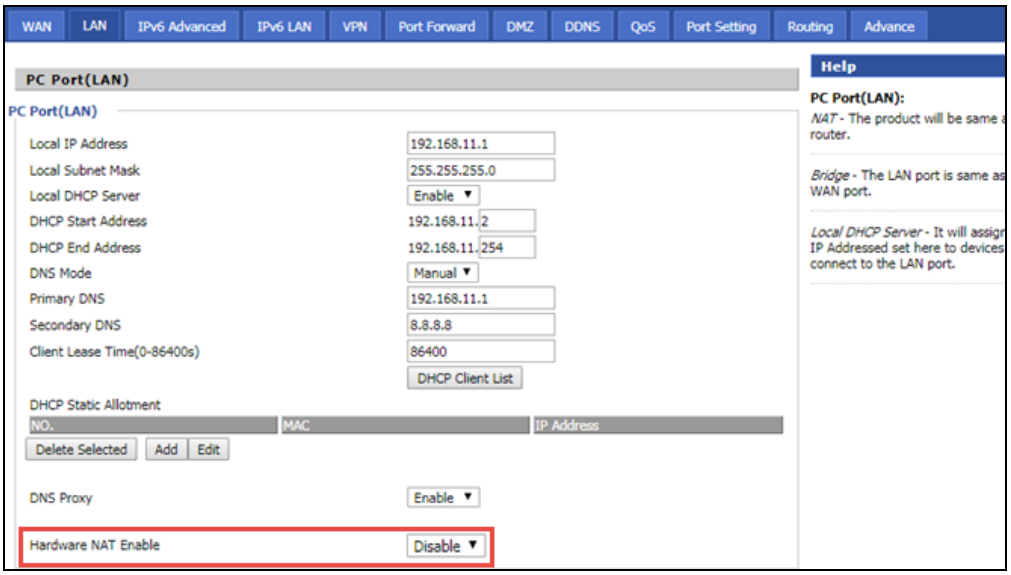
Table 14: Q-in-Q



Field Name	Description
VLAN Mode	Enable VLAN Mode.
SVLAN(Q-in-Q)	Enable Q-in-Q feature.
SVLAN ID	Enter a value for SVLAN ID (1-4094).

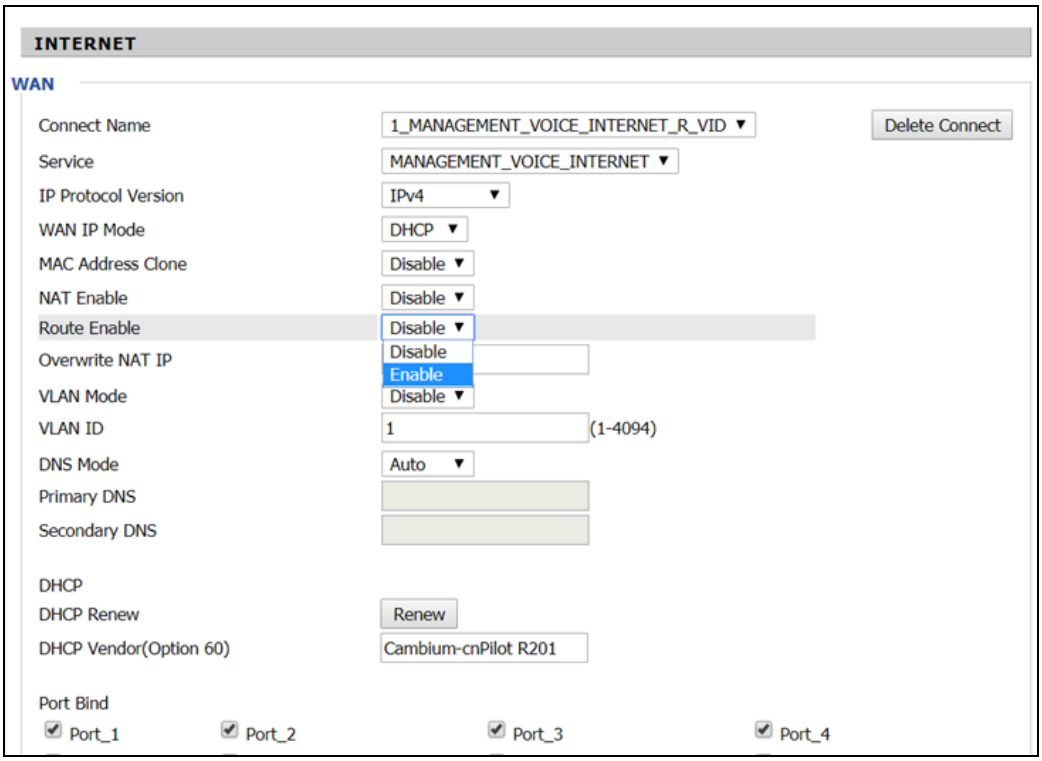
Note

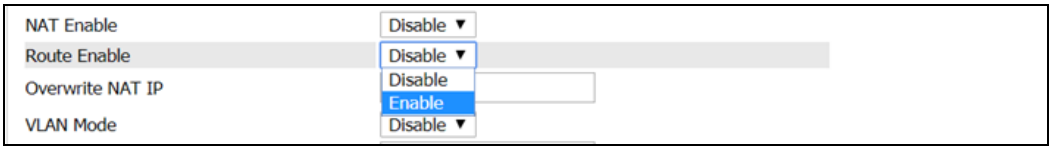
Ensure that **Hardware NAT Enable** option is disabled in the LAN page for R201/R201P/R201W models. The Hardware NAT Enable option is available only for R201 models. See the following image:



Route mode

The Route mode is an additional mode of operation for the device. In order to setup Route mode operation, turn offNAT Enable. This feature cannot be used with Multi-WAN configuration.





NAT Enable must be disabled for **Route Enable** to setup.

MAC clone

Some ISPs require to register your MAC address. If you do not wish to re-register your MAC address, you can have the router clone the MAC address that is registered with your ISP. To use the Clone Address button, the computer accessing the web management interface will have the MAC address automatically entered in the Clone WAN MAC field.

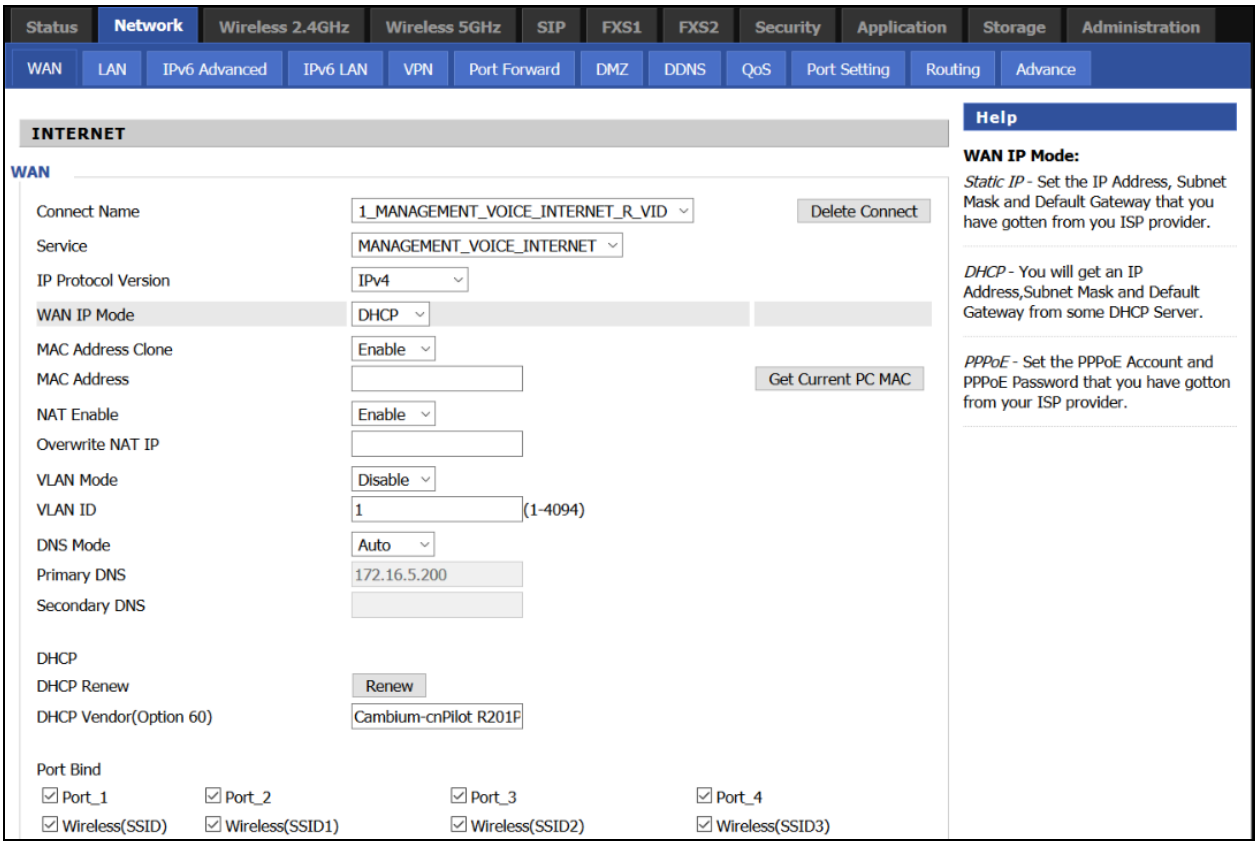


Figure 13: *MAC clone*

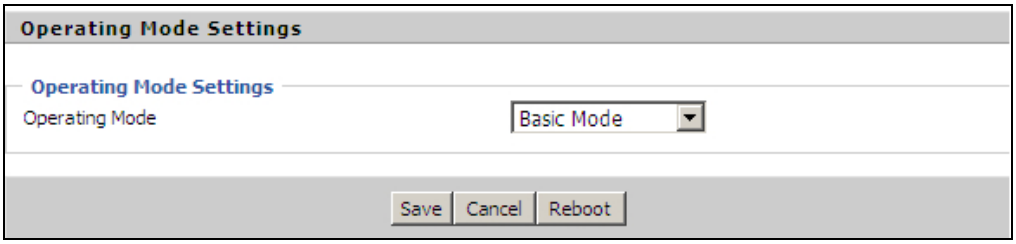
Table 15: MAC clone

Procedure
1. Press Get Current PC MAC button to get PC's MAC address.
2. Press Save button to save your changes if users don't want to use MAC clone, press Cancel button to cancel the changes.
3. Press Reboot button to make the changes effective.

Fast Bridge setting

To set the Fast Bridge, perform the following steps:

1. Login to the web management interface of the cnPilot Home Router. Navigate to Page **Administration > Operating Mode**. Set **Operating mode** to **Basic Mode**. Click **Save**.



2. Open **Network > WAN** change NAT Enable to Disable. Click **Save** and then **Reboot**. The device is now operating in Bridge mode.

3. Log into the device and navigate to **Status > Basic** to display the device configuration.

IPv6 address configuration

The **cnPilot Home Router** devices support IPv6 addressing, starting from Firmware version 4.3.

This section covers:

- Introduction to Ipv6
- Enabling IPv6
- Configuring IPv6
- Viewing WAN port status
- Ipv6 DHCP configuration for LAN/WLAN clients
- LAN DHCPv6

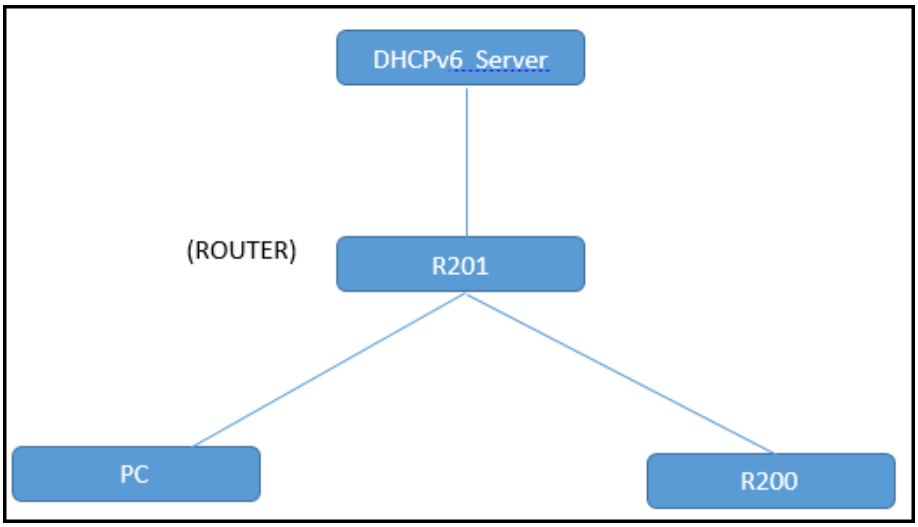
Introduction to Ipv6

DHCPv6 protocol is used to automatically provision/configure Ipv6 capable end points in a local network. In addition to acquiring an Ipv6 IP address for the WAN interface and its associated LAN/WLAN clients, the cnPilot Home Router devices are also capable of prefix delegation.

The cnPilot Home Router devices support the following types of modes of Ipv6 addresses:

- Stateless DHCPv6
- Statefull DHCPv6

Table 16: Ipv6 Modes

Mode	Description
Stateless	In **Stateless DHCPv6** mode, the cnPilot Home Router listen for ICMPv6 Router Advertisements messages which are periodically sent out by the routers on the local link or requested by the node using a Router Advertisements solicitation message. The device derives a unique Ipv6 address using prefix receives from the router and its own MAC address. 
Statefull	In **Statefull DHCPv6** mode, the client works exactly as Ipv4 DHCP, in which hosts receive both their Ipv6 addresses and additional parameters from the DHCP server.

Enabling IPv6

To enable Ipv6 functionality, perform the following steps:

1. Navigate to **Network > IPv6** Advanced page.
2. Select **Enable** from the IPv6 Enable drop-down list.
3. Click **Save**.

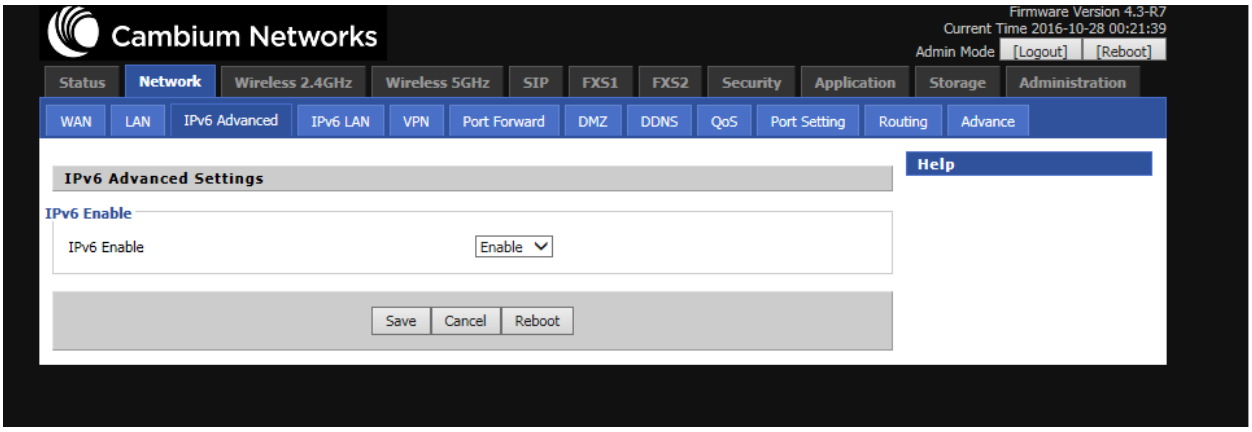


Figure 14: *Enabling IPv6*

Configuring IPv6

Configuring Statefull IPv6

Navigate to **Network** > **WAN** page. The following window is displayed:

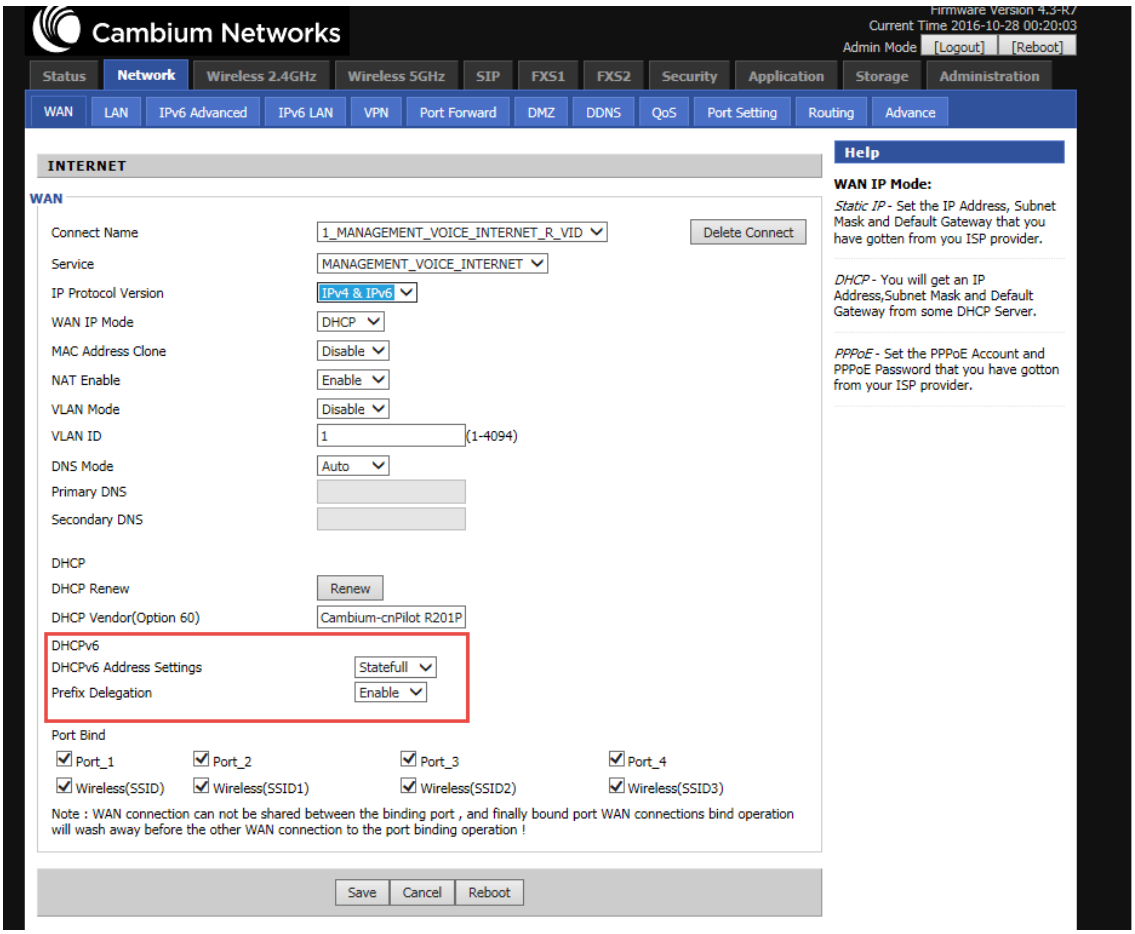


Figure 15: *Configuring Statefull IPv6*

Table 17: Configuring Statefull Ipv6

Field Name	Description
IP Protocol Version	Enable IPv4 and IPv6 option.
WAN IP Mode	Set it to **DHCP**.
NAT Enable	Select **Enable**.
DHCPv6 Address Settings	Set it to **Statefull** mode.
Prefix Delegation	Select **Enable**.

Configuring Stateless Ipv6

To configure Stateless Ipv6, see Figure 16

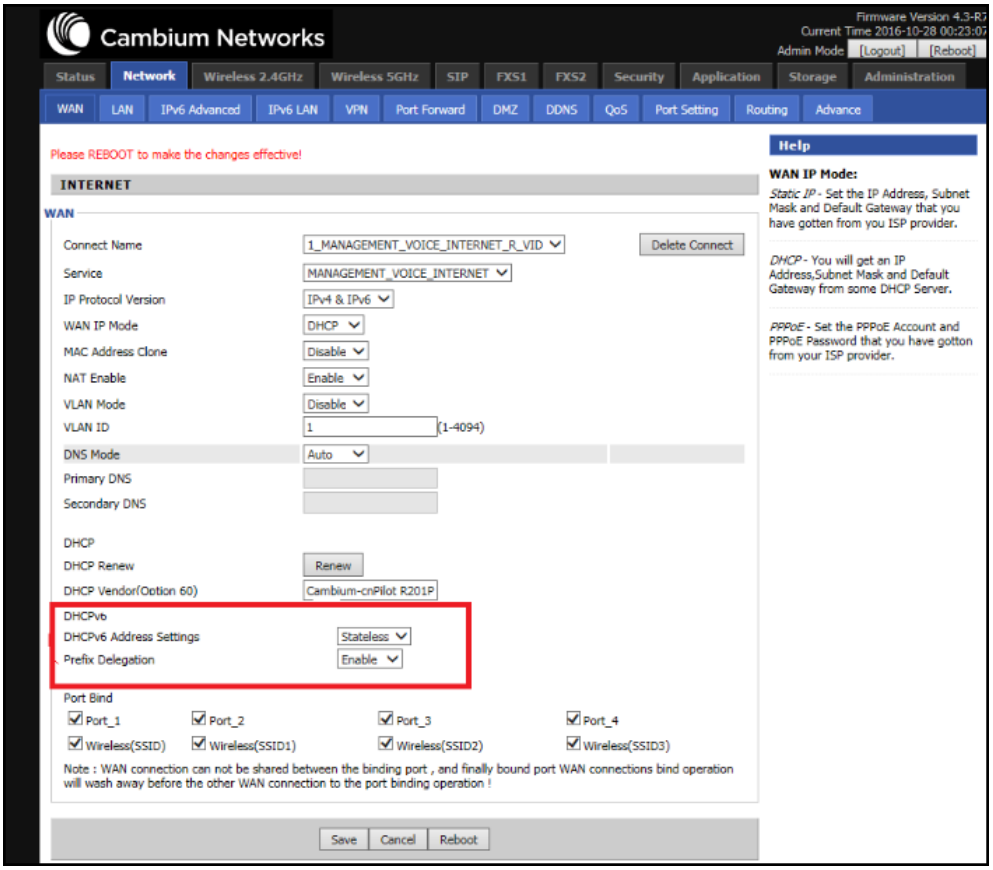


Figure 16: *Configuring Stateless Ipv6*

Table 18: Configuring Stateless Ipv6

Field Name	Description
IP Protocol Version	Enable Ipv4 and Ipv6 option.
WAN IP Mode	Set it to **DHCP**.
NAT Enable	Select **Enable**.
DHCPv6 Address Settings	Set it to **Stateless** mode.
Prefix Delegation	Select **Enable**.

Viewing WAN port status

To view the status of WAN port, navigate to the **Status** page.

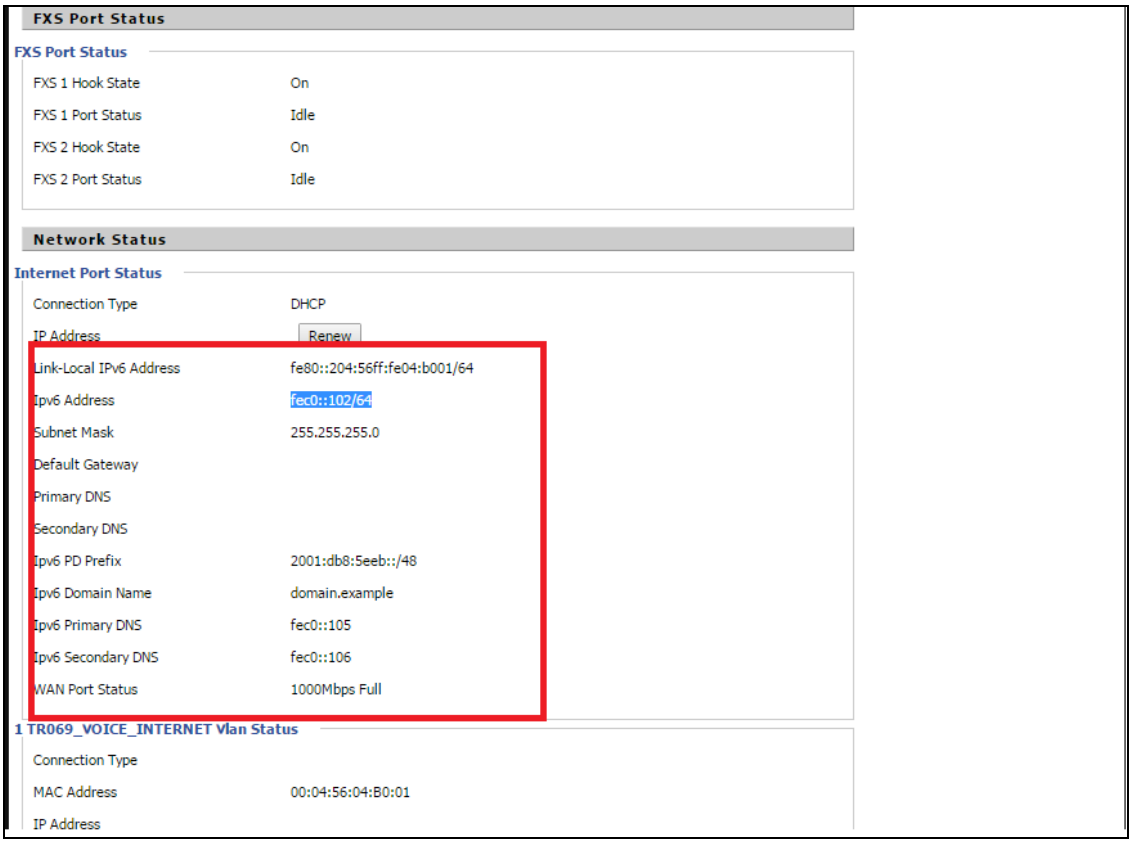


Figure 17: *The Status page*

Ipv6 DHCP configuration for LAN/WLAN clients

Wired and wireless clients connected to cnPilot Home Routers can obtain their Ipv6 addresses based on the configuaration of LAN side DHCPv6 parameters. The cnPilot Home Routers can be either configured as a DHCPv6 server in which the LAN/WLAN clients get Ipv6 addresses from the configured pool.

If DHCP server is disabled on the cnPilot Home Routers, the clients get Ipv6 addresses from the external DHCPv6 server configured in the network.

LAN DHCPv6

When IPv6 is enabled, the LAN/WLAN clients of cnPilot Home Routers can be configured to receive IPv6 addresses from locally configured IPv6 pool or from an external DHCPv6 server.

To enable LAN DHCPv6 service, see Figure 18.

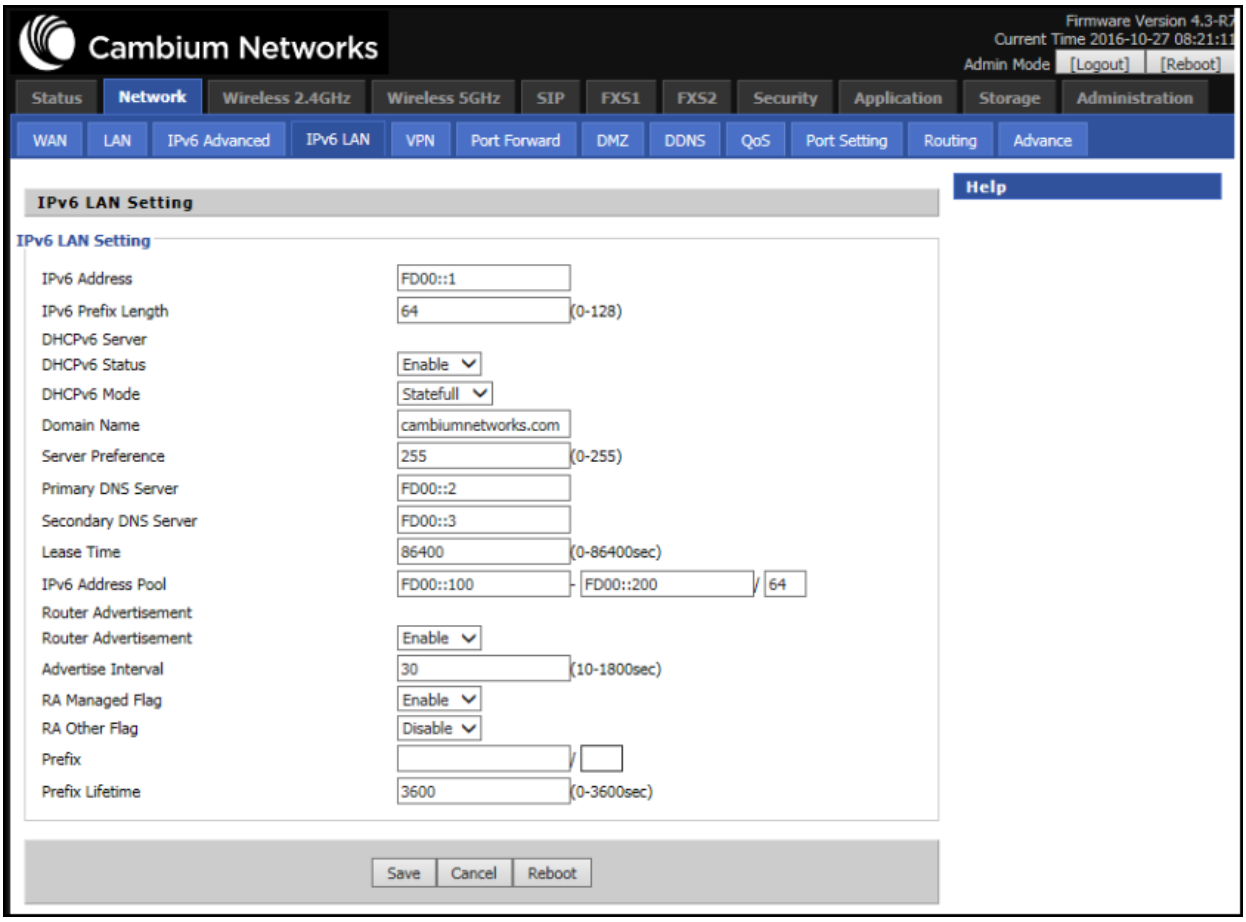


Figure 18: *Enabling LAN DHCPv6 service*

The following table describes flag mappings of IPv6 router advertisement:

Table 19: IPv6 router advertisement flag mappings

Method	DHCPv6	Router advertisement	RA managed	RA Other	Address (Last 64 bits)	Prefix	Gateway	DNS
Static	None	NA	NA	NA	Manual	Manual	Manual	Manual
SLAAC	0	1	NA	0	RA	RA	RA	None
Stateless DHCPv6	1	1	0	1	RA	RA	RA	DHCPv6
Statefull DHCPv6	1	1	1	1 or 0	DHCPv6	DHCPv6	RA	DHCPv6

NA - The value can be 0 or 1.

LAN

The user can plug computers and other devices that need an Internet connection by using the LAN ports.

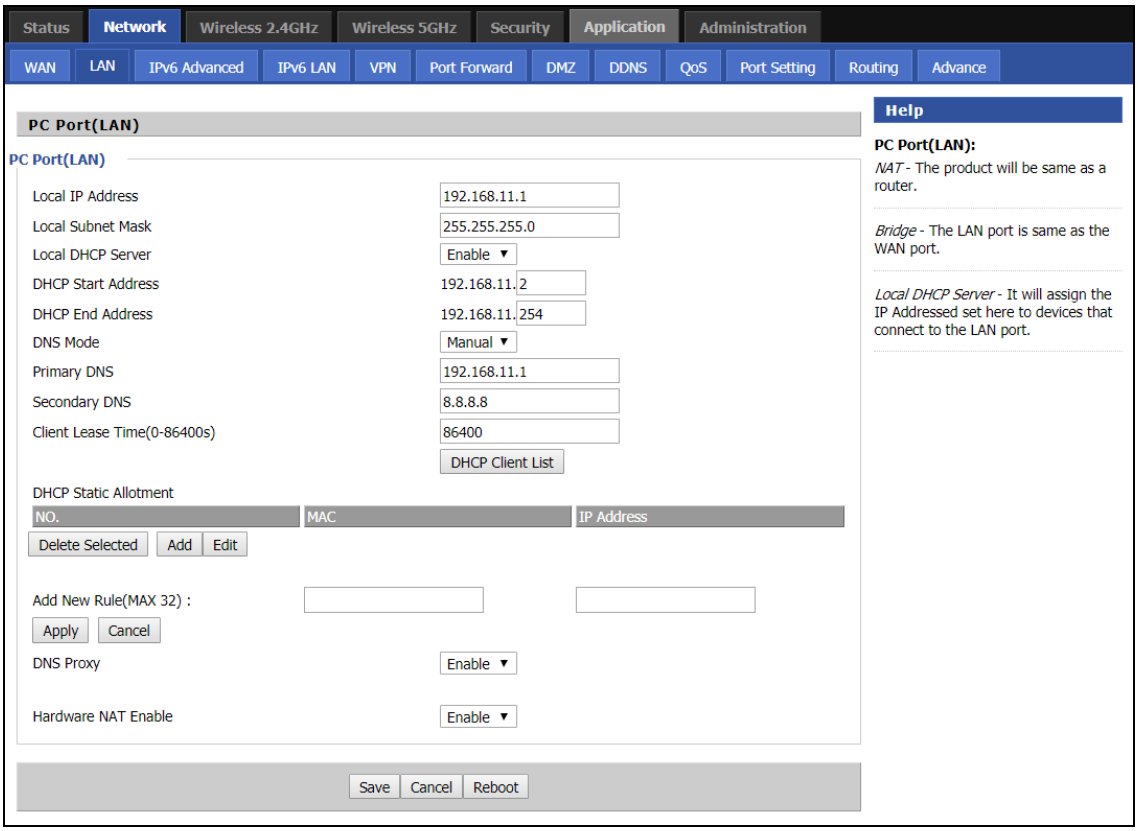


Figure 19: *LAN port*

Table 20: LAN port

Field Name	Description
IP Address	Enter the IP address of the router on the local area network. All the IP addresses of the computers which are in the router's LAN must be in the same network segment with this address, and the default gateway of the computers must be this IP address. (The default is 192.168.11.1).
Local Subnet Mask	Enter the subnet mask to determine the size of the network (default is 255.255.255.0/24).
Local DHCP Server	Enable/Disable Local DHCP Server.
DHCP Start Address	Enter a valid IP address as a starting IP address of the DHCP server, and if the router's LAN IP address is 192.168.11.1, starting IP address can be 192.168.11.2 or greater, but should be less than the ending IP address.
DHCP End Address	Enter a valid IP address as an end IP address of the DHCP pool.
DNS Mode	Select DNS mode, options are Auto and Manual.
Primary DNS	Enter the preferred DNS address.
Secondary DNS	Enter the secondary DNS address.

Field Name	Description
Client Lease Time	This option defines how long the address will be assigned to the computer within the network. In that period, the server does not assign the IP address to the other computer.
DNS Proxy	Enable or disable; If enabled, the device forwards the DNS request of LAN-side network to the WAN side network.
Hardware NAT Enable	Enable or disable Hardware NAT

DHCP server

The router has a integrated Dynamic Host Configuration Protocol (DHCP) server that assigns private IP address to each local client.

The router, by factory default acts a DHCP server for your network so it automatically dispatches related IP settings to any local user configured as a DHCP client. It is highly recommended that you leave the router enabled as a DHCP server if you do not have a DHCP server for your network.

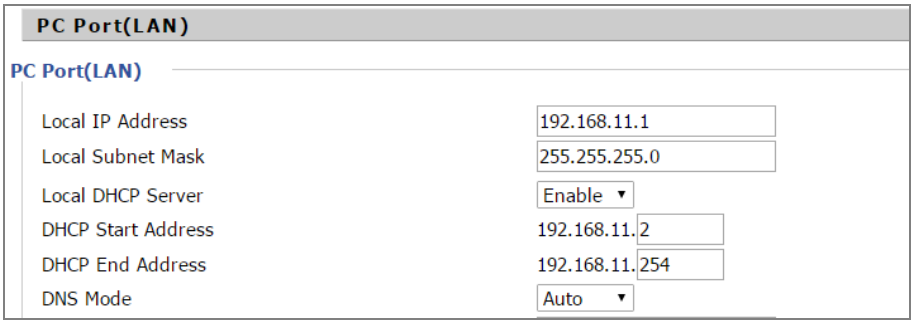


Figure 20: *DHCP server*

Table 22 DHCP server settings

Field Name	Description
Local DHCP Server	Enable/Disable DHCP server.
DHCP Start Address	Enter a value of the IP address pool for the DHCP server to start with when issuing IP addresses.
DHCP End Address	Enter a value of the IP address pool for the DHCP server to end with when issuing IP addresses.
DNS Mode	If DNS information is to be received from a network server, set this parameter to Auto. If DNS information is to be configured manually, set this parameter to Manual.

Primary DNS	192.168.11.1
Secondary DNS	8.8.8.8
Client Lease Time(0-86400s)	86400
	DHCP Client List

Table 21: DHCP server, DNS and Client Lease Time

Field Name	Description
Primary DNS	Specify the Primary DNS address provided by your ISP. If your ISP does not provide it, the router will automatically apply default DNS Server IP address: 202.96.134.33 to this field.
Secondary DNS	Specify the Secondary DNS address provided by your ISP. If your ISP does not provide this address, the router will automatically apply default Secondary DNS Server IP of 202.96.128.86 to this field. If both the Primary IP and Secondary IP Address fields are left empty, the router will assign its own IP address to local users as a DNS proxy server and maintain a DNS cache.
Client Lease Time	It allows you to set the leased time for the specified PC.

VPN

cnPilot Home Router supports VPN connections with PPTP-based VPN servers.

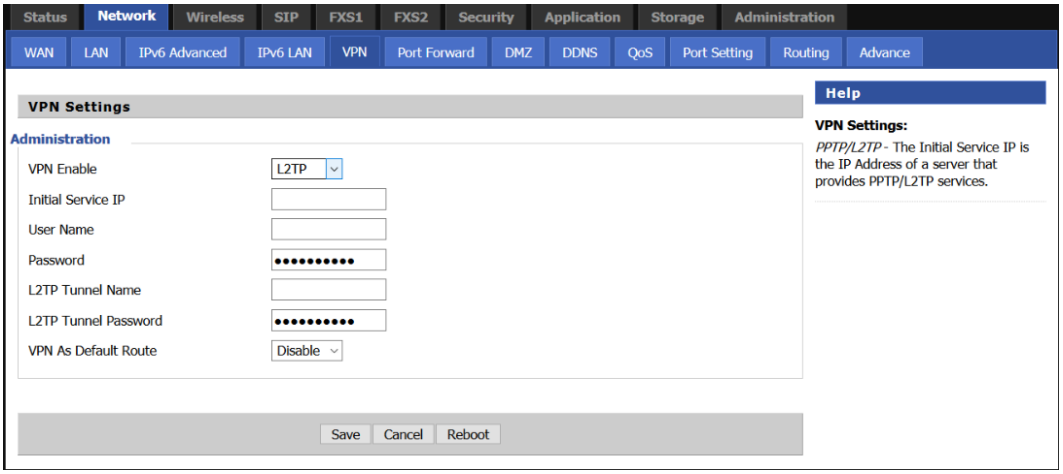


Figure 21: *The VPN settings page*

Table 22: VPN

Field Name	Description
VPN Enable	Enable/Disable VPN. If the VPN is enabled, user can select PPTP and L2TP mode VPN.
Initial Service IP	Enter VPN server IP address.

Username	Enter authentication username.
Password	Enter authentication password.
L2TP Tunnel Name	Enter the name for L2TP tunnel.
L2TP Tunnel Password	Enter the password for L2TP tunnel.
VPN As Default Route	Enable/Disable the VPN as default route.

DMZ

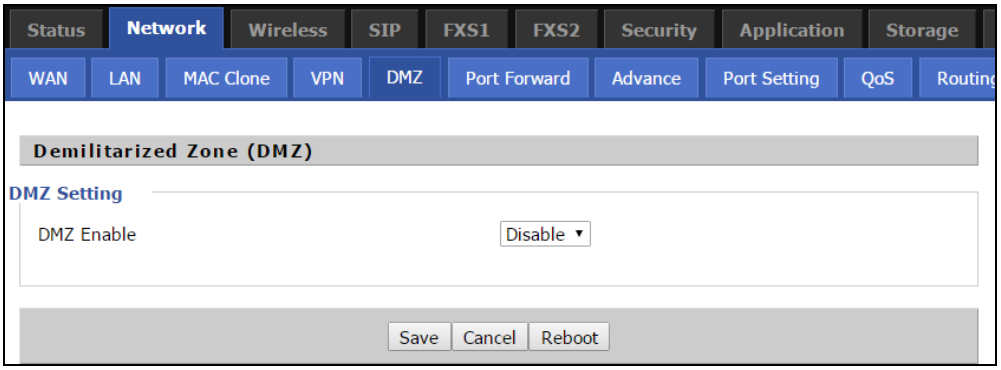


Figure 22: *The DMZ page*

Table 23: DMZ

Field Name	Description
DMZ Enable	Enable/Disable DMZ.
DMZ Host IP Address	Enter the private IP address of the DMZ host.

Port Forward

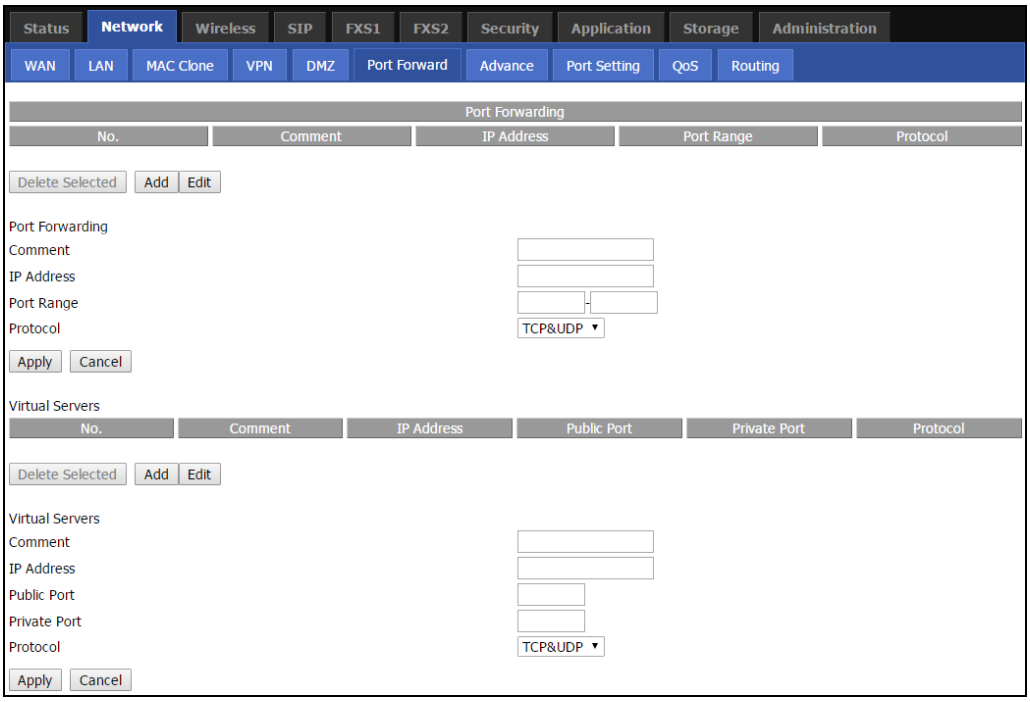


Figure 23: *The Port Forward page*

Table 24: Elements in the Port Forward page

Field Name	Description
Comment	Sets the name of a port mapping rule or comment.
IP Address	The IP address of devices under the LAN port.
Port Range	Set the port range for the devices under the LAN port (1-65535).
Protocol	You can select TCP, UDP, TCP & UDP three cases.
Apply/Cancel	After finish configurations, click apply, the number will be generated under NO. List; click Cancel to if you do not want to make the changes.
Comment	To set up a virtual server notes.
IP Address	Virtual server IP address.
Public Port	Public port of virtual server .
Private Port	Private port of virtual server.
Protocol	You can select from TCP, UDP, and TCP&UDP.
Apply/Cancel	After finish configurations, click **Apply**, the number is generated under **NO**. Click **Cancel** to if you do not want to make the changes.

DDNS Setting

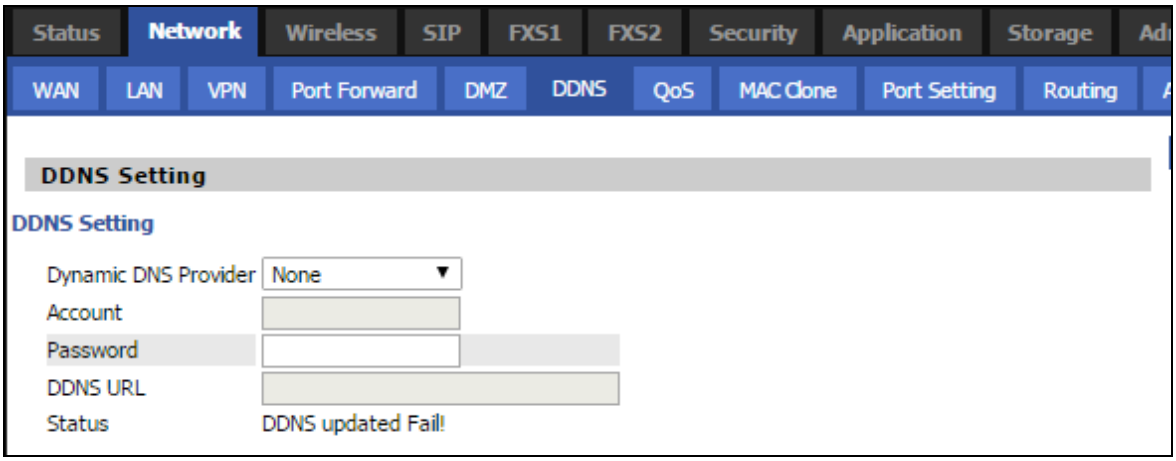


Figure 24: *DDNS Setting*

Table 25: Elements in the DDNS Setting page

Field Name	Description
Dynamic DNS Provider	DDNS is enabled and select a DDNS service provider.
Account	Enter the DDNS service account.
Password	Enter the DDNS service account password.
DDNS	Enter the DDNS domain name or IP address.
Status	Displays the DDNS upgrade status.

Advance

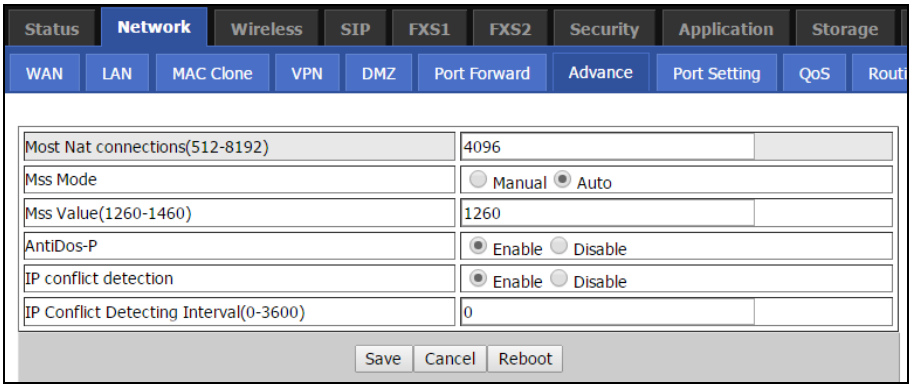


Figure 25: *The Advance page*

Table 26: Elements in the advance page

Field Name	Description
Most Nat connections	The largest value which the cnPilot Home Router can provide.
Mss Mode	Choose Mss Mode as Manual or Auto.
Mss Value	Set the value of TCP.
AntiDos-p	You can choose to enable or disable.
IP conflict detection	You can choose to enable or disable.
IP conflict Detecting Interval	Detect IP address conflicts of the time interval.

Port Setting

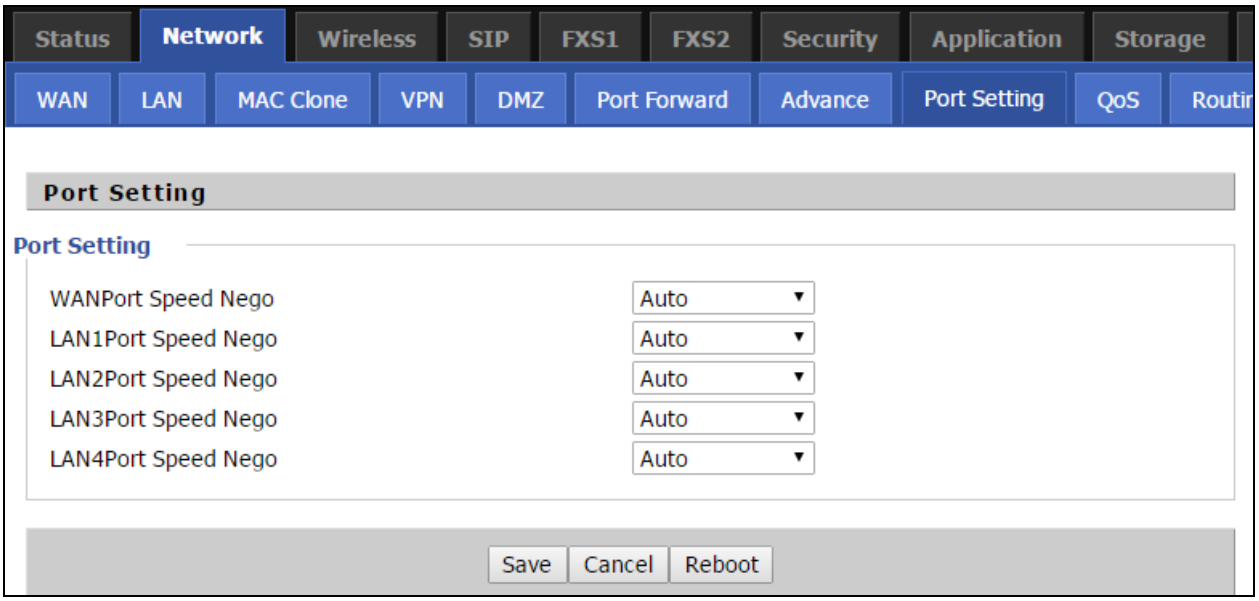


Figure 26: *The Port Setting page*

Table 27: Port setting

Field Name	Description
WAN Port speed Nego	Auto-negotiation, options are Auto, 100M full, 100M half-duplex, 10M half and full.
LAN1~LAN4 Port Speed Nego	Auto-negotiation, options are Auto, 100M full, 100M half, 10M half and 10M full.

QoS setting

QoS is capability of a network to provide a better service to certain network traffic flows. The primary goal of QoS is to provide a priority including dedicated bandwidth, low latency, and improved loss

characteristics. Ensure that providing priority for one or more flows does not make other flows fail. cnPilot Home Routers are implemented with **Token Bucket** flow for QoS. If QoS is enabled without adding any rules, then **Hardware NAT** gets disabled and leads to decreased throughput.

The user can classify traffic based on source, destination IP, and MAC addresses. After classification of traffic, user can assign priority and rate limit the traffic stream. The bandwidth is shared with other low priority queues/traffic if there is no or less traffic than assigned rate limit.

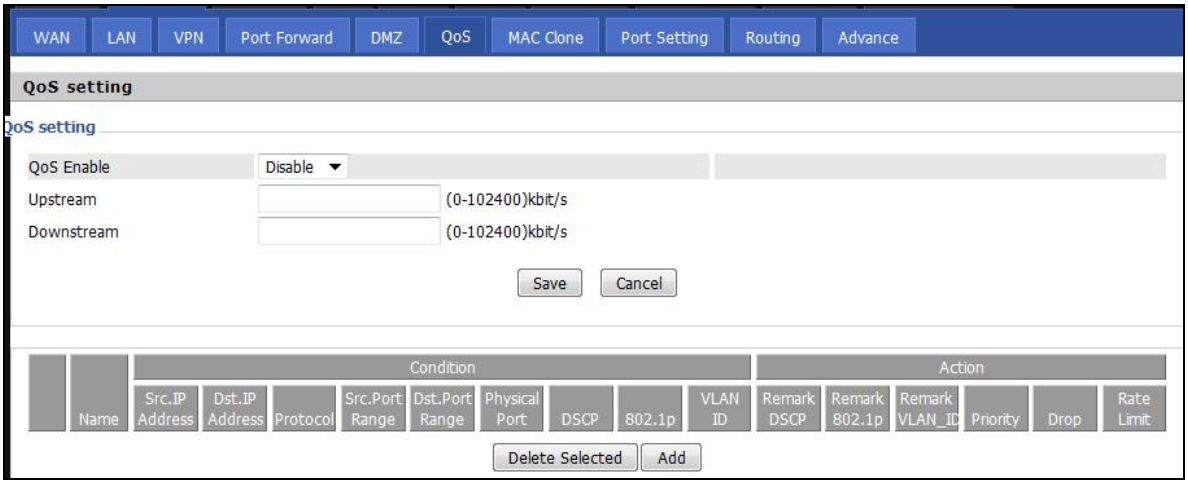


Figure 27: *The QoS setting page*

Table 28: Elements in the QoS setting page

Field Name	Description
QoS Enable	Enable/Disable QoS function.
Upstream	Set the upstream bandwidth.
Downstream	Set the downstream bandwidth.
Delete Selected	Check the items you want to delete, click **Delete** option.
Add	Click **Add** to add a new rule.

Note

From system release 4.2 or later, the QoS bandwidth can be configured for Upstream and Downstream.

Routing

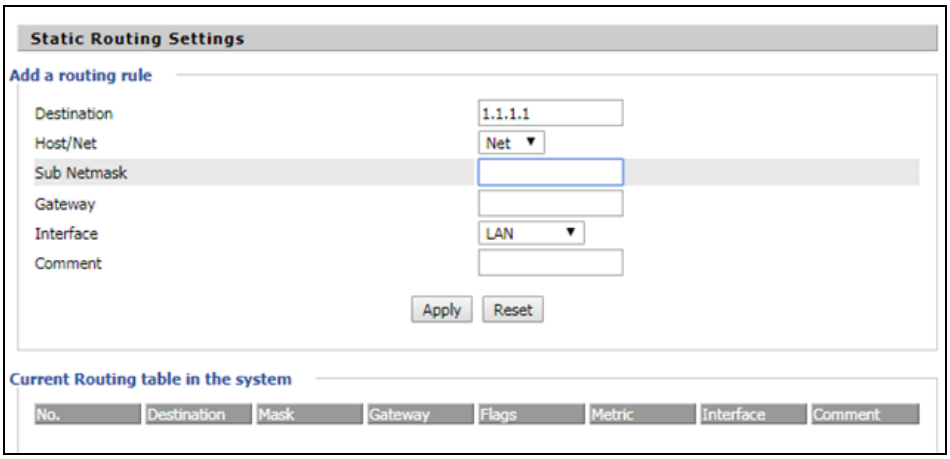


Figure 28: *The Static Routing Settings page*

Table 29: Elements in the Static Routing Settings page

Field Name	Description
Destination	Address of the destination.
Host/Net	Indicates whether single host or a network is being specified. If Net, then one more option appears then configure the subnet.
Gateway	Gateway IP address
Interface	Select the desired LAN/WAN interface.
Comment	Comments.

Wireless

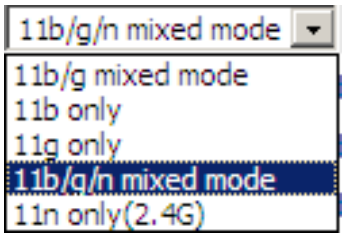
Note

Starting from 4.4 release, any changes in the Wireless/Radio configuration performed on the cnPilot Home Routers can be applied on the fly and does not require a reboot. However, for all other configuration sections a reboot is required to make new configuration changes effective.

Basic

Table 30: Basic

Field Name	Description
Radio on/off	Select **Radio off** to disable wireless. Select **Radio on** to enable wireless.
Wireless connection mode	According to the wireless client type, select one of the modes. Modes are AP/ Repeater. Default is AP.

Field Name	Description
Network Mode	Choose one network mode from the drop-down list. For 5 GHz radio the default is 11vht AC/AN/A. Default is 11b/g/n mixed mode. 
SSID	It is the basic identity of wireless LAN. SSID can be any alphanumeric or a combination of special characters. It will appear in the wireless network access list.
Multiple SSID1~SSID3	cnPilot r190V/r190W/r200/r200P Routers support 4 SSIDs on each radio.
Hidden	After the item is checked, the SSID is no longer displayed in the search for the Wi-Fi wireless network connection list
Broadcast (SSID)	After initial State opening, the device broadcasts the SSID of the router to wireless network.
AP Isolation	If AP isolation is enabled, the clients connected to the AP cannot access each other. It is controlled from 2.4 GHz radio page only. This setting enables / disables the isolation for both 2.4 GHz and 5 GHz radios.
MBSSID Isolation	If MBSSID isolation is enabled, the clients connected to different SSIDs on same AP cannot access each other. It is controlled from 2.4 GHz radio page. This setting Enable / Disable the isolation for both 2.4 GHz and 5 GHz radios.
BSSID	MAC address of the AP.
Frequency (Channel)	You can select Auto Select.
HT Physical Mode Operating Mode	1. Mixed Mode: In this mode, the previous wireless card can recognize and connect to the Pre-N AP, but the throughput will be affected 2. Green Field: high throughput can be achieved, but it will affect backward compatibility, and security of the system
Channel Bandwidth	Select channel bandwidth, default is 20 MHz and 20/40 MHz. Default is 20/40
Guard Interval	Select long/short. default is short.
Reverse Direction Grant (RDG)	**Enabled**: Devices on the WLAN are able to transmit to each other without requiring an additional contention-based request to transfer (i.e. devices are able to transmit to another device on the network during TXOP) **Disabled**: Devices on the WLAN must make a request for transmit when communicating with another device on the network

Field Name	Description
STBC	Space-time Block Code **Enabled**: Multiple copies of signals are transmitted to increase the chance of successful delivery **Disabled**: STBC is not employed for signal transmission
Aggregation MSDU (A-MSDU)	**Enabled**: Allows the device to aggregate multiple Ethernet frames into a single 802.11n, thereby improving the ratio of frame data to frame overhead **Disabled**: No frame aggregation is employed at the router
Auto Block Ack	**Enabled**: Multiple frames are acknowledged together using a single Block Acknowledgement frame. **Disabled**: Auto block acknowledgement is not used by the device – use this configuration when low throughput/connectivity issues are experienced by mobile devices
Decline BA Request	**Enabled:** Disallow block acknowledgement requests from devices **Disabled:** Allow block acknowledgement requests from devices
HT Disallow TKIP	**Enabled**: Disallow the use of Temporal Key Integrity Protocol for connected devices **Disabled**: Allow the use of Temporal Key Integrity Protocol for connected devices
HT LDPC	**Enabled:** Enable Low-Density Parity Check mechanism for increasing chance of successful delivery in challenging wireless environments **Disabled**: Disable Low-Density Parity Check mechanism

Wireless security

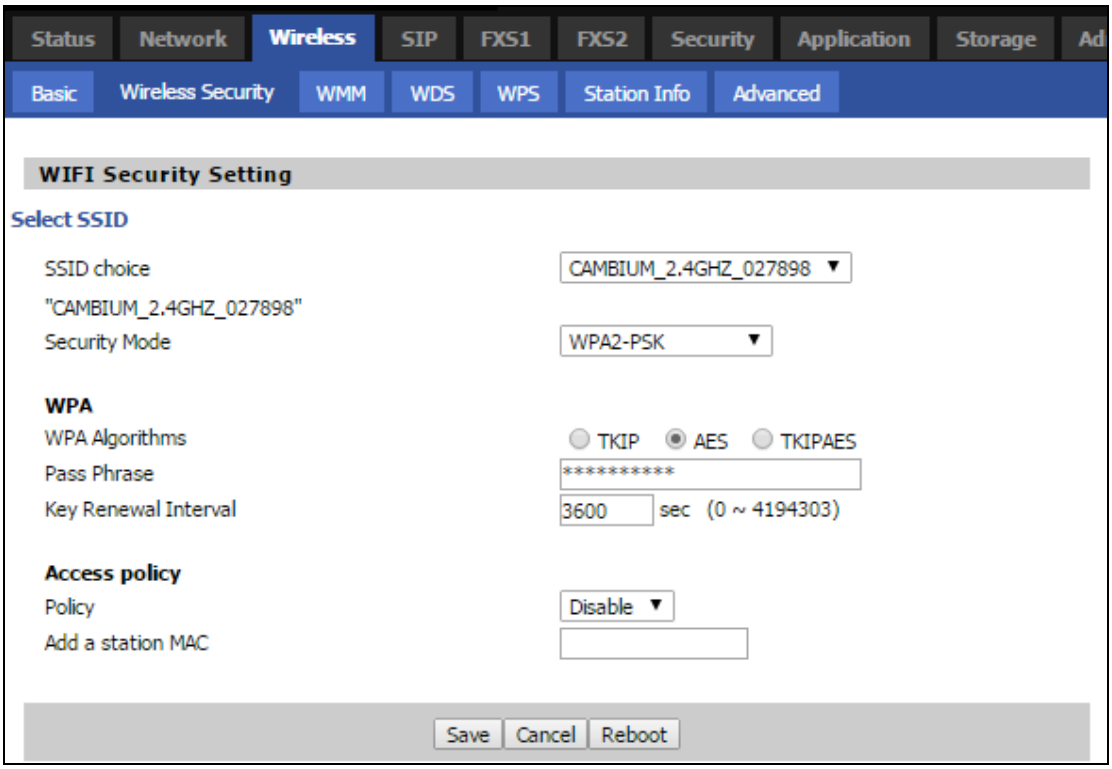


Table 31: Wireless security

Field Name	Description
SSID Choice	Select the SSID for which security parameters need to be configured.
Security Mode	Select an appropriate encryption mode to improve the security and privacy of your wireless data packets. Each encryption mode will bring out different web page and ask you to offer additional configuration.

User can configure the corresponding parameters. Here are some common encryption methods:

OPENWEP: A handshake way of WEP encryption, encryption via the WEP key:

Table 32: Wi-Fi Security Setting

Field Name	Description
Security mode	This is used to select one of the 4 WEP keys, key settings on the clients should be the same with this when connecting.
WEP Keys	Set the WEP key. A-64 key need 10 Hex characters or 5 ASCII characters; choose A-128 key need 26 Hex characters or 13 ASCII characters.
WEP represents Wired Equivalent Privacy, which is a basic encryption method.	

WPA-PSK, the router will use WPA way which is based on the shared key-based mode:

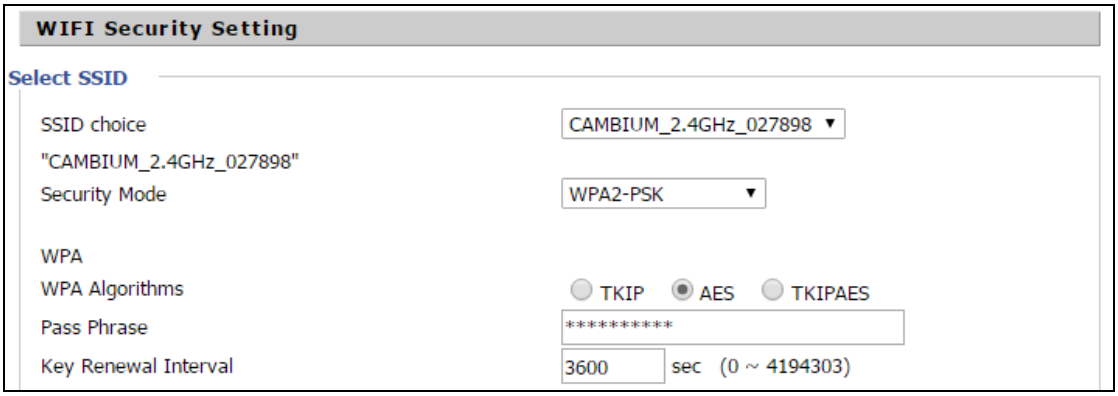


Table 33: WPA-PSK

Field Name	Description
WPA Algorithms	This item is used to select the encryption of wireless home gateway algorithms, options are TKIP, AES and TKIPAES.
Pass Phrase	Setting up WPA-PSK security password.
Key Renewal Interval	Set the key scheduled update cycle, default is 3600s.

WPAPSKWPA2PSK manner is consistent with WPA2PSK settings:

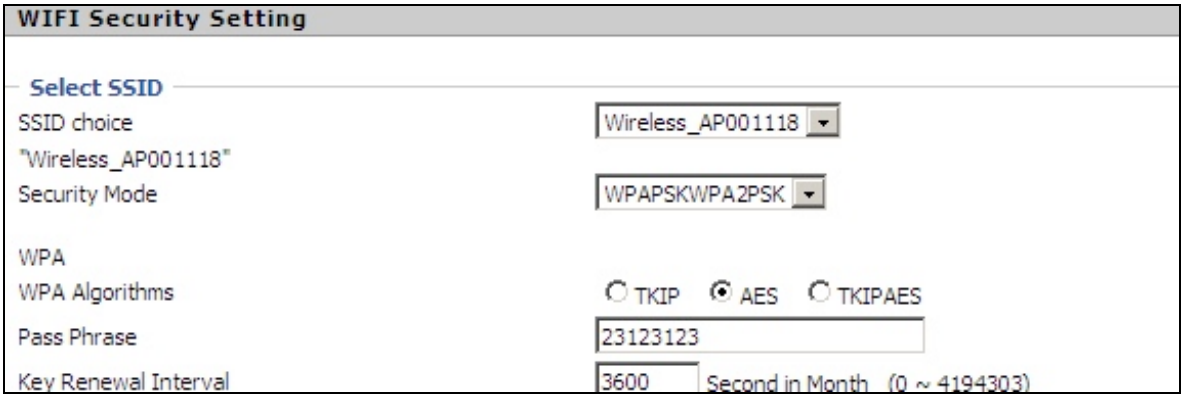


Table 34: WPAPSKWPA2PSK

Field Name	Description
WPA Algorithms	The home gateway is used to select the wireless security encryption algorithm options are TKIP, AES, TKIP / AES. 11N mode does not support TKIP algorithms.
Pass Phrase	Set WPA-PSK/WPA2-PSK security code
Key Renewal Interval	Set the key scheduled update cycle, default is 3600s

Field Name	Description
WPA-PSK/WPA2-PSK WPA/WPA2 security type is a simplified version, which is based on the WPA shared key mode, higher security setting is also relatively simple, suitable for ordinary home users and small businesses.	

Wireless access policy

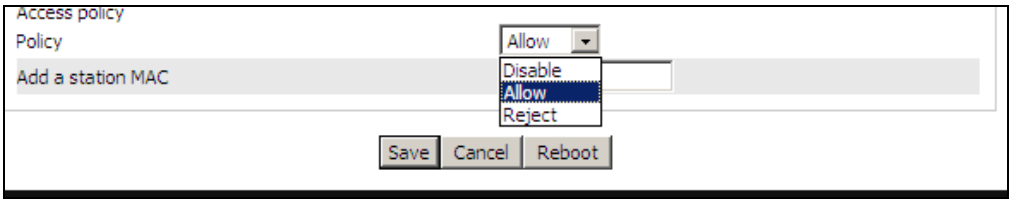


Table 35: Wireless Access Policy

Field Name	Description
Access policy	Wireless access control is used to allow or prohibit the specified client to access to your wireless network based on the MAC address.
Policy	Disable: Prohibition: wireless access control policy. Allow: only allow the clients in the list to access. Rejected: block the clients in the list to access.
Add a station MAC	Enter the MAC address of the clients which you want to allow or prohibit.
Example: Prohibit the device whose wireless network card MAC address is 00:1F: D0: 62: BA: FF's to access the wireless network and allow other computers to access the network. Implementation: As shown, the Policy is Reject, add 00:1F: D0: 62: BA: FF to the MAC, click Save and reboot the device settings to take effect.	

WMM

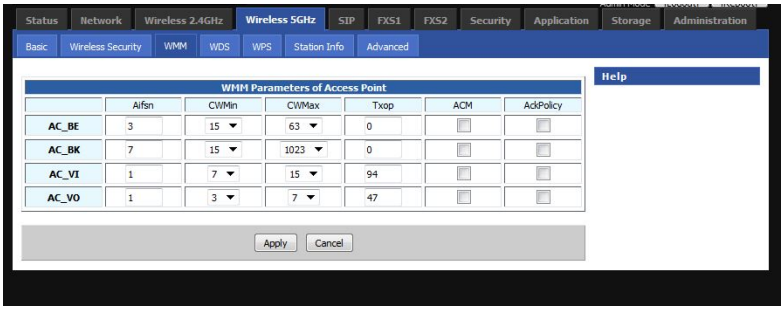
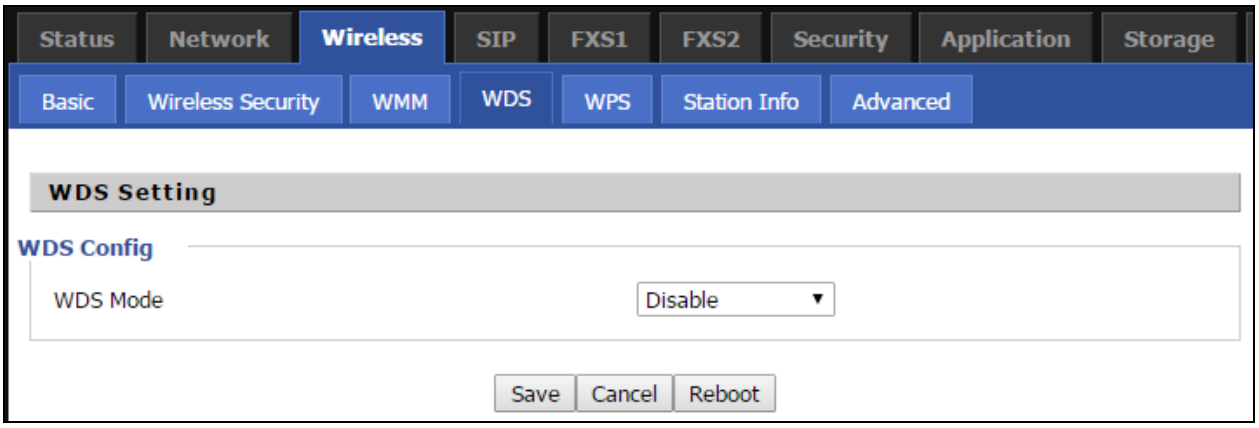


Table 36: WMM

Description
WMM (Wi-Fi Multi-Media) is the QoS certificate of Wi-Fi Alliance (WFA). This provides you to configure the parameters of wireless multimedia; WMM allows wireless communication to define a priority according to the home gateway type. To make WMM effective, the wireless clients must also support WMM.

WDS



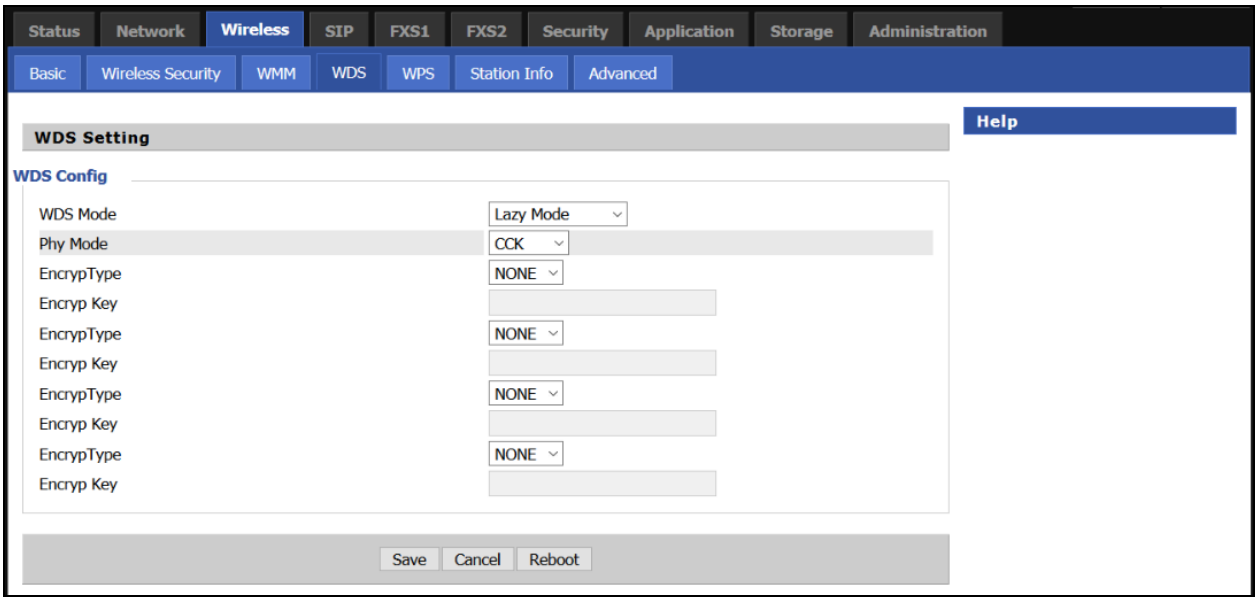


Table 37: WDS

Description
WDS stands for Wireless Distribution System, enabling WDS access points to be interconnected to expand a wireless network.

WPS

WPS (Wi-Fi Protected Setup) provides easy procedure to make network connection between wireless station and wireless access point with the encryption of WPA and WPA2.

> **Note**
>
> WPS is disabled by default. To enable WPS, under WPS Setting, select Enable from the drop-down and click Apply.

It is the simplest way to build connection between wireless network clients and wireless access point. Users do not need to select any encryption mode and type any long encryption passphrase to setup a wireless client every time. The only requirement is for the user to press the WPS button on the wireless client, and WPS will connect for client and router automatically.

Perform the below steps on cnPilot for WPS (it is applicable only for cnPilot r195W Home Router):

1. Tap **WPS** button on the phone.
2. Press WPS button on cnPilot r195W Home Router (press-and-release).
    - if you press WPS button only once (press and release), then the client connects to 2.4G radio
    - if you press WPS button twice within 2 seonds, then the client connects to 5GHz
    - if you press and hold WPS button for more than 2 seconds, then no action happens.

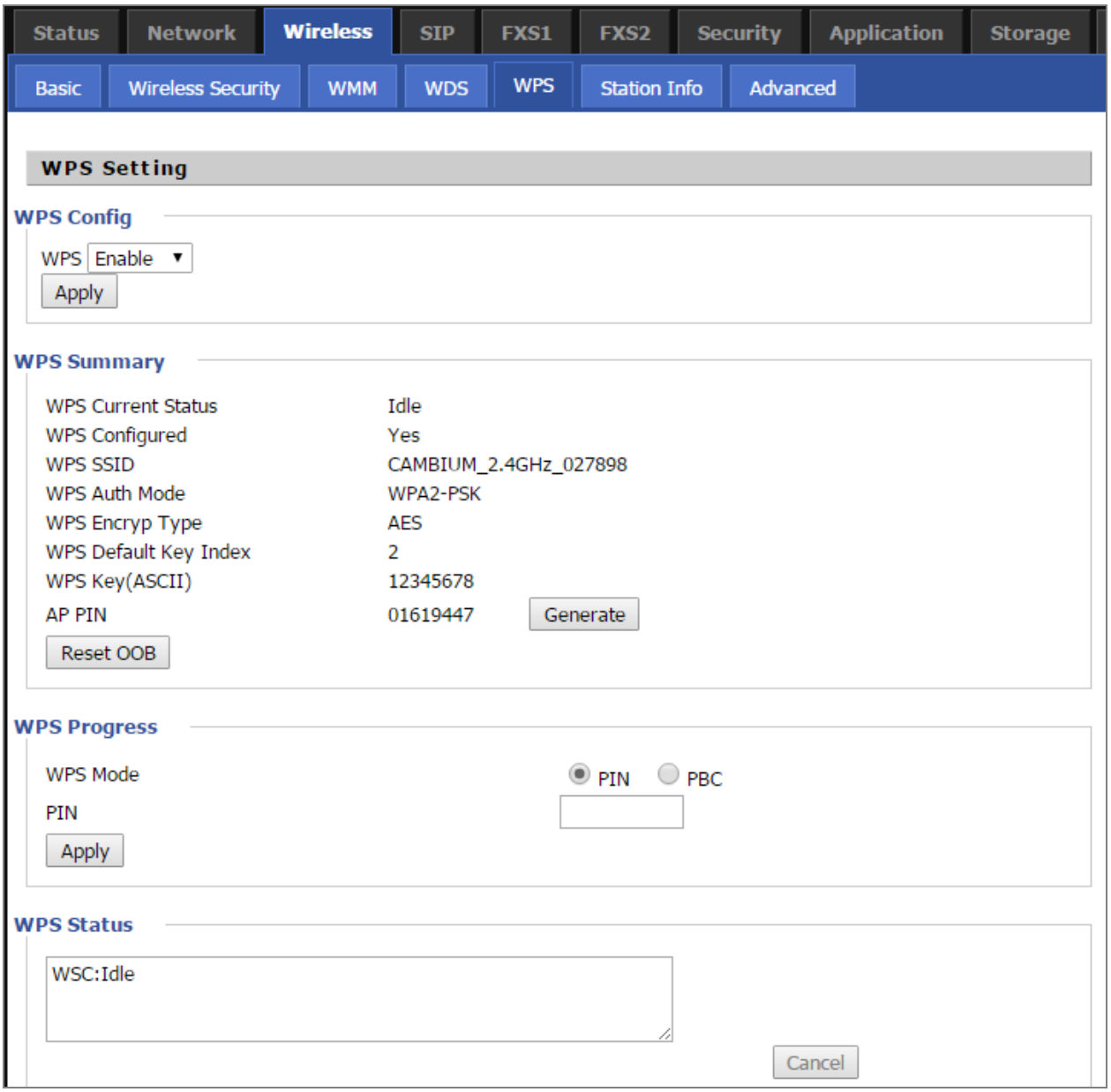


Table 38: WPS

Field Name	Description
WPS Setting	Enable/Disable WPS function
WPS Summary	Display the current status of WPS, including current state, SSSID name, authentication methods, encryption type and the PIN code of this AP.
Generate	Generate a new PIN code

Field Name	Description
Reset OOB	• cnPilot Wi-Fi r190V/r190W/r200/r200P Routers use a default security policy to allow other non-WPS users to access and apply.
WPS Mode	• **PIN**: Enter the PIN code of the wireless device which accesses to this LAN in the following option, and press apply. Then cnPilot Home Router r190V/r190W/r200/r200P begins to send signals, turn on the PIN accessing method on the clients, and then it can access the wireless AP automatically. • **PBC**: There are two ways to start PBC mode, user can press the PBC button directly on the device or select PBC mode on the software and apply. Users can activate WPS connection in WPS mode through these two methods, only when the clients choose PBC access, the clients can connect the AP automatically.
WPS Status	WPS shows status in three ways: • WSC: Idle • WSC: Start WSC process (begin to send messages) • WSC: Success; this means clients have accessed the AP successfully

Station Info

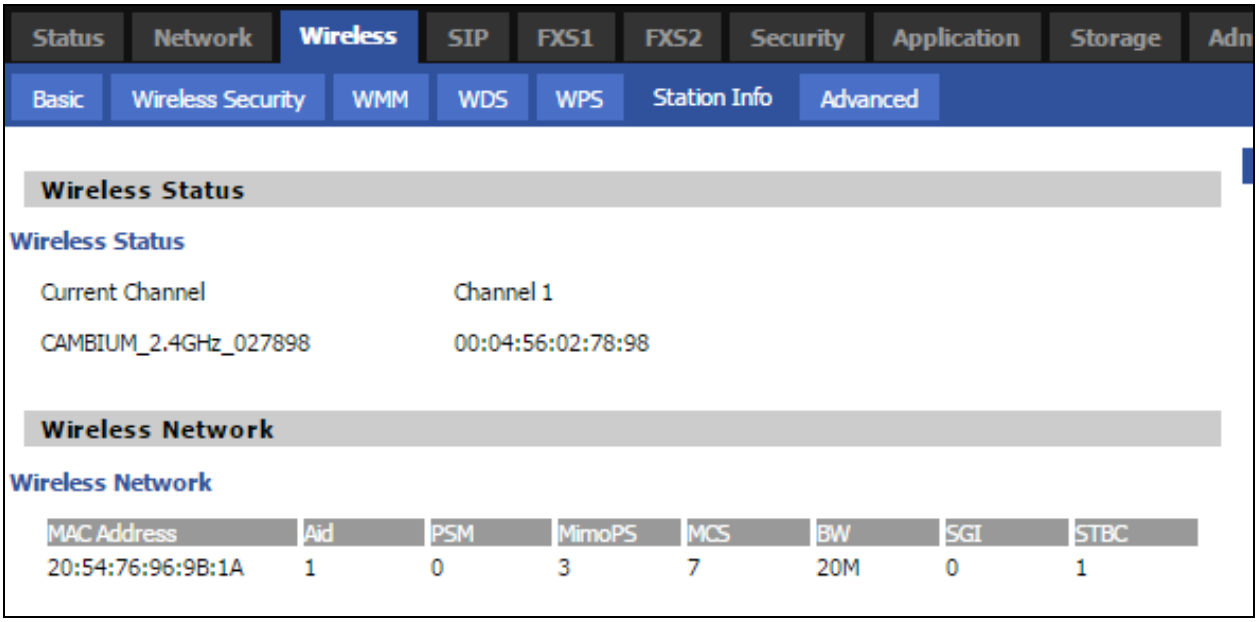


Table 39: Station info

Description
This page displays information about the current registered clients' connections including operating MAC address and operating statistics.

Advanced

Table 40: Advanced

Field Name	Description
BG Protection Mode	Select G protection mode, options are on, off and automatic.
Beacon Interval	The interval of sending a wireless beacon frame, within this range, it will send a beacon frame for the information of the surrounding radio network.
Data Beacon Rate (DTIM)	Specify the interval of transmitting the indication message, it is a kind of cut down operation, and it is used for informing the next client which is going to receive broadcast multi-cast.
Fragment Threshold	Specify the fragment threshold for the packet, when the length of the packet exceeds this value, the packet is divided.
RTS Threshold	Specify the packet RTS threshold, when the packet exceeds this value, the router will send RTS to the destination site consultation
Short Preamble	Default is Enable, cnPilot r190V/r190W/r200/r200P Routers system is not compatible with traditional IEEE802.11, the operation rate can be 1.2Mpbs.
Short Slot	Enable/Disable short slot. By default, it is enabled. It is helpful in improving the transmission rate of wireless communication.
Tx Burst	One of the features of MAC layer, it is used to improve the fairness for transmitting TCP.
Pkt_ Aggregate	It is a mechanism that is used to enhance the LAN, in order to ensure that the home gateway packets are sent to the destination correctly.
IEEE802.11H support	Enable/Disable IEEE802.11H Support. By default, it is disabled.
Country Code	Select country code, options are CN, US, JP, FR, TW, IE, HK and NONE.
Wi-Fi Multimedia (WMM)	
WMM Capable	Enable/Disable WMM.
APSD Capable	Enable/Disable APSD. Once it is enabled, it may affect wireless performance, but can play a role in energy-saving power.
WMM Parameters	Press WMM Configuration, the webpage will jump to the configuration page of Wi-Fi multimedia.
Multicast-to-Unicast Converter	Enable/Disable Multicast-to-Unicast. By default, it is Disabled.

WDS

See WDS.

WPS

See WPS.

Station Info

See Station Info.

Advanced

See Advanced.

Parental control

Bark

cnPilot Home Routers supports **Bark Parental Control** application. This manages the bark cloud account and on accessing this link from any LAN client of Access Point (AP) and it identifies all the devices connected to the network. Pairing code is used to identify the AP in the bark cloud account and this code is changed only after factory reset of cnPilot Home Router. The devices are identified based on the MAC address. If any device uses randomized MAC address on every connection, then this device is treated as a guest and guest rules are applied. The device access can be denied completely.

Unlimited clients and unlimited devices can be paired in single account. Bark application can be installed on the child's phone to monitor the device. Child application should be added into the bark cloud settings to monitor the messages or content being consumed by the child. If the bark application is disabled/uninstalled, then a warning message is displayed to the child. The child can remove the application from the phone where a notification is sent to the parent through SMS, E-mail, and, App notification. All settings can be controlled, modified, and updated from bark cloud. Bark cloud allows the device to monitor the traffic and content based on the severity of the settings.

If VPN is enabled on the device, then the traffic is considered as unidentified traffic and all the traffic are discarded. Bark cloud deletes any explicit content of child from apps/sites that are monitored and stores it on a designated private space, and notifies the parent about this activity with a link for the deleted content. To go to bark settings, navigate to **Security** > **Bark**. The **Bark Settings** window is shown in Figure 29.

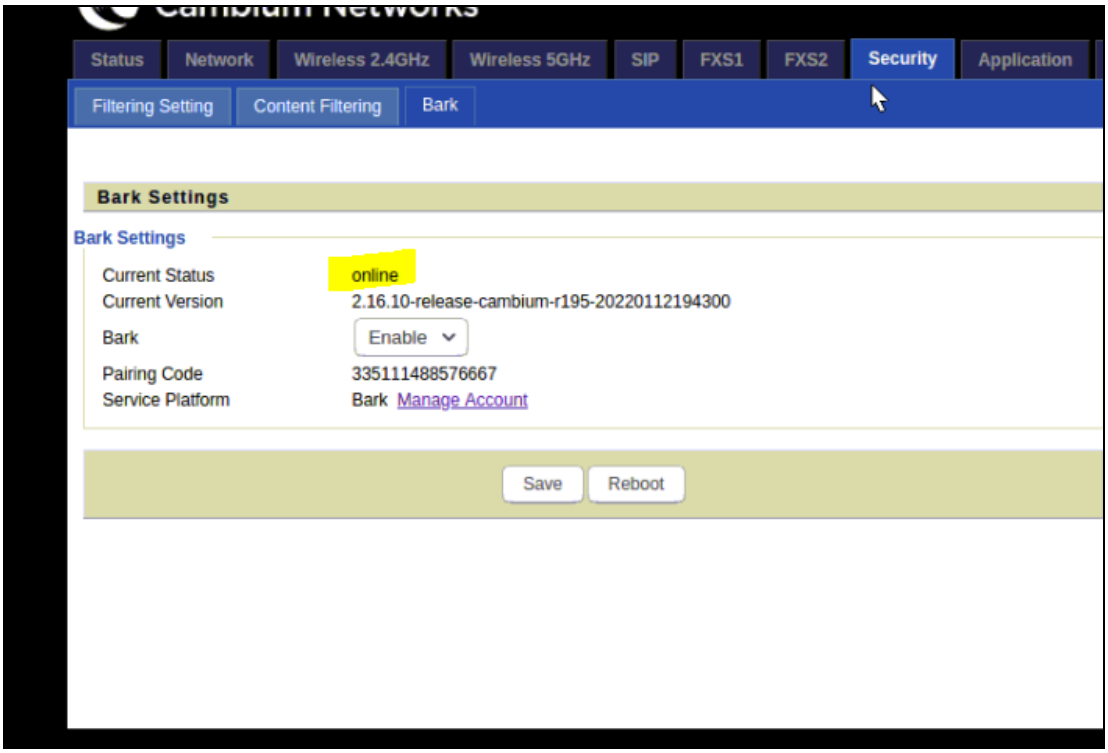


Figure 29: *Bark Settings window*

Table 41 describes the elements in **Bark Settings** window.

Table 41: Bark Settings window elements

Element	Description
Current Status	Current status of the device. The following are three status of the device: • **Connecting**: Trying to register with the cloud. • **Ready**: Ready to connect to the bark cloud. • **Online**: Successfully registered on the bark cloud.
Current version	Displays the current version of the installed software.
Bark	To enable / disable the bark settings.
Pairing code	Code to identify the AP.
Service Platform	Manages the bark account.

Note

Bark has the precedence over parental control. If parental control to be enabled, then disable the bark.

SIP

cnPilot Home Routers have 2 FXS ports to make SIP (Session Initiation Protocol) calls for the supported models. Before registering, the device user should have a SIP account configured by the system administrator or provider. See the section below for more information.

SIP Settings

Table 42: SIP settings

Field Name	Description
SIP T1	The minimum scale of retransmission time
Max Forward	SIP contains Max Forward message header fields used to limit the requests for forwards.
SIP Reg User Agent Name	The agent name of SIP registered user
Max Auth	The maximum number of retransmissions
Mark All AVT Packets	Voice packet marking to enable this item will see the mark on the voice message when the call environment changed (such as press a key during the call)
RFC 2543 Call Hold	Enable the Connection Information field displays the address is 0.0.0.0 in the invite message of Hold. Disable the Connection Information field displays the device IP address in the invite message of Hold.
SRTP	Whether to enable the call packet encryption function
SRTP Prefer Encryption	The preferred encryption type of calling packet (the Message body of INVITE Message)
Service Type	Choose the service type.
NAT Traversal	Enable/Disable NAT Traversal cnPilot Home Router supports STUN Traversal; if user wants to traverse NAT/Firewall, select the STUN.
STUN Server Address	Add the correct STUN service provider IP address.
NAT Refresh Interval	Set NAT Refresh Interval, default is 60s.
STUN Server Port	Set STUN Server Port, default is 5060.

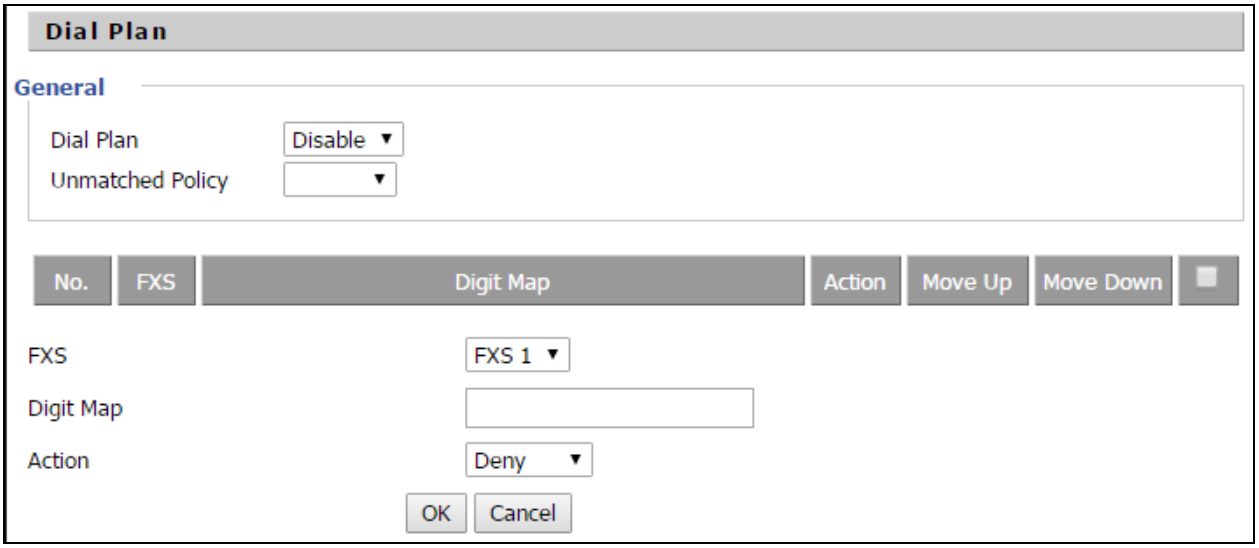
Parameters and Settings

Table 43: Parameters and settings

Field Name	Description
Dial Plan	Enable/Disable dial plan.
Line	Set the line.

Field Name	Description
Digit Map	Enter the sequence used to match input number The syntactic - refer the following Dial Plan Syntactic
Action	Choose the dial plan mode from Deny and Dial Out. Deny means cnPilot Home Routers will reject the matched number, while Dial Out means cnPilot Home Routers will dial out the matched number.
Move Up	Move the dial plan up the list
Move Down	Move the dial plan down the list

Adding one Dial Plan



1. Enable **Dial Plan**.
2. Click **Add**, and the configuration table.
3. Fill in the value of parameters.
4. Press **OK** to end configuration.

Dial Plan Syntactic

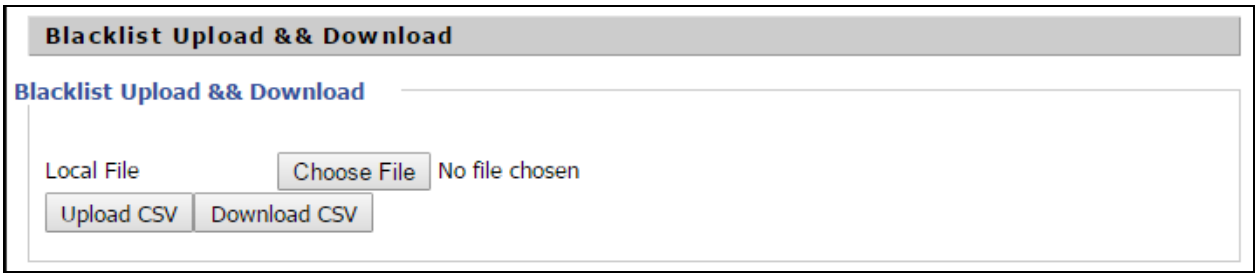
Table 44: Dial Plan

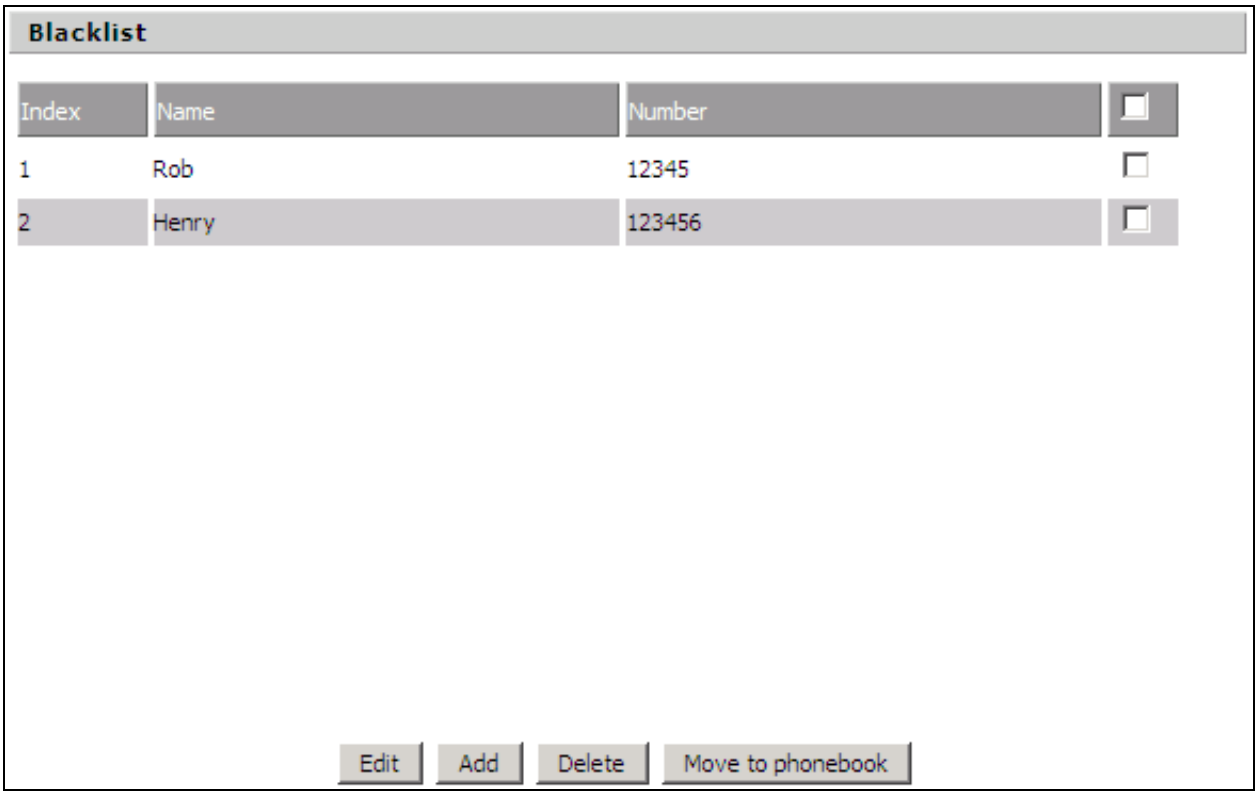
No.	String	Description
1	0 1 2 3 4 5 6 7 8 9 * #	Allowed characters
2	x	Lowercase letter x stands for one legal character
3	[sequence]	To match one-character form sequence. For example: [0-9]: match one digit from 0 to 9

No.	String	Description
		[23-5*]: match one character from 2 or 3 or 4 or 5 or *
4	x.	Match to x^0, x^1, x^2, x^3..... x^n For example: “01.”:can match ”0”, “01”, “011”, ”0111”, ..., ”01111...”
5	<dialed:substituted>	Replace dialed with substituted. For example: <8:1650>123456: input is “85551212”, output is“16505551212”
6	x,y	Make outside dial tone after dialing “x”, stop until dialing character “y” For example: “9,1xxxxxxxxxx”: the device reports dial tone after inputting “9”, stops tone until inputting “1” “9,8,010x”: make outside dial tone after inputting “9”, stop tone until inputting “0”
7	T	Set the delayed time. For example: “<9:111>T2”: The device will dial out the matched number “111” after 2 seconds.

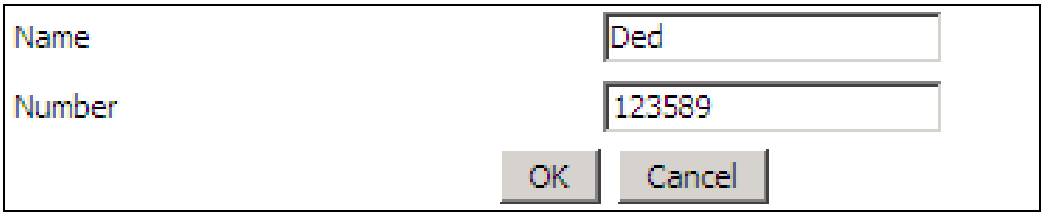
Blacklist

In this page, user can upload or download blacklist file, and can add or delete or edit blacklist one by one.





1. Click 浏览… to select the blacklist file and click upload CSV to upload it to cnPilot Home Router. Click download CSV to save the blacklist file to your local computer.
2. Select one contact and click edit to change the information, click **Delete** to delete the contact, click **Move** to phonebook to move the contact to phonebook.
3. Click **Add** to add one blacklist, enter the name and phone number, click **OK** to confirm and click **Cancel** to cancel.



Call Log

To view the call log information such as redial list (incoming call), answered call and missed call.

Table 45: Call log

Redial List

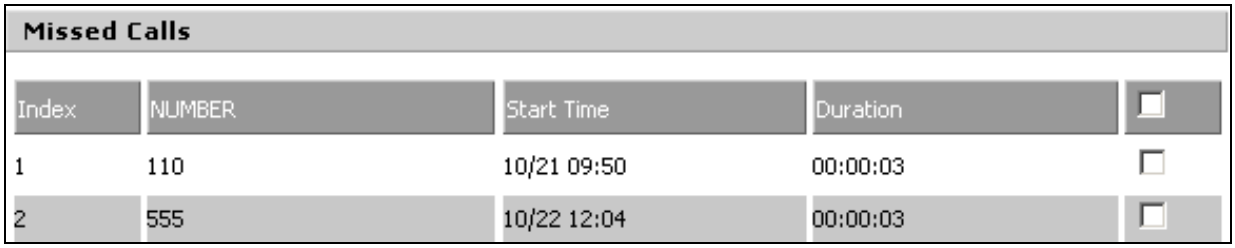
Index	NUMBER	Start Time	Duration	
1	123	10/28 10:30	00:00:07	☐
2	010123	10/28 12:02	00:00:01	☐
3	010123	10/28 16:16	00:00:00	☐
4	010123	10/28 16:16	00:00:00	☐
5	123	10/28 16:20	00:00:13	☐
6	123	10/28 16:21	00:00:34	☐
7	123	10/29 10:50	00:00:10	☐
8	123	10/29 14:36	00:00:01	☐
9	123	10/29 15:05	00:00:23	☐
10	123	10/29 15:06	00:00:05	☐

Redial List

Answered Calls

Index	NUMBER	Start Time	Duration	
1	22222	10/21 09:56	00:00:40	☐
2	110	10/21 18:14	00:00:03	☐
3	110	10/21 18:15	00:00:07	☐
4	sipp	10/23 13:40	00:00:06	☐
5	sipp	10/24 18:05	00:00:05	☐
6	sipp	10/24 18:05	00:00:05	☐
7	sipp	10/25 15:38	00:00:03	☐
8	sipp	10/25 15:42	00:00:06	☐
9	sipp	10/25 15:55	00:00:10	☐
10	sipp	10/25 16:03	00:00:02	☐

Answered Calls



Missed Calls

VoIP QoS

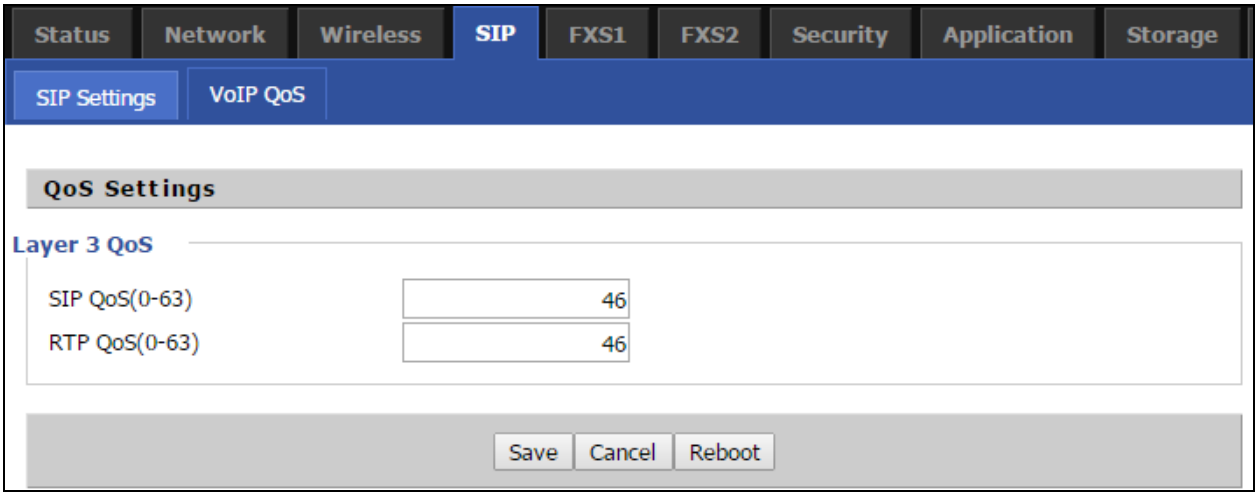


Table 46: VoIP QoS

Field Name	Description
SIP /RTP QoS	The default value is 0, you can set a range of values is 0~63

FXS1

SIP Account

Basic

Set the basic information provided by your VOIP Service Provider, such as Phone Number, Account, password, SIP Proxy and others.

Warning

3-wire connection is not supported.

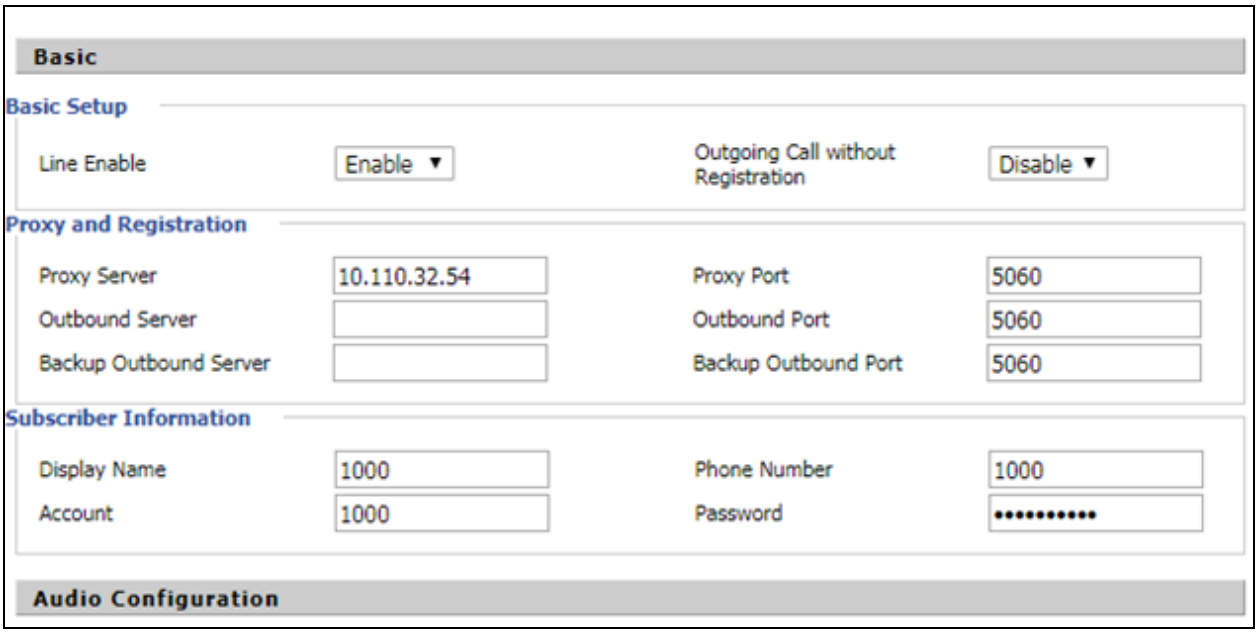
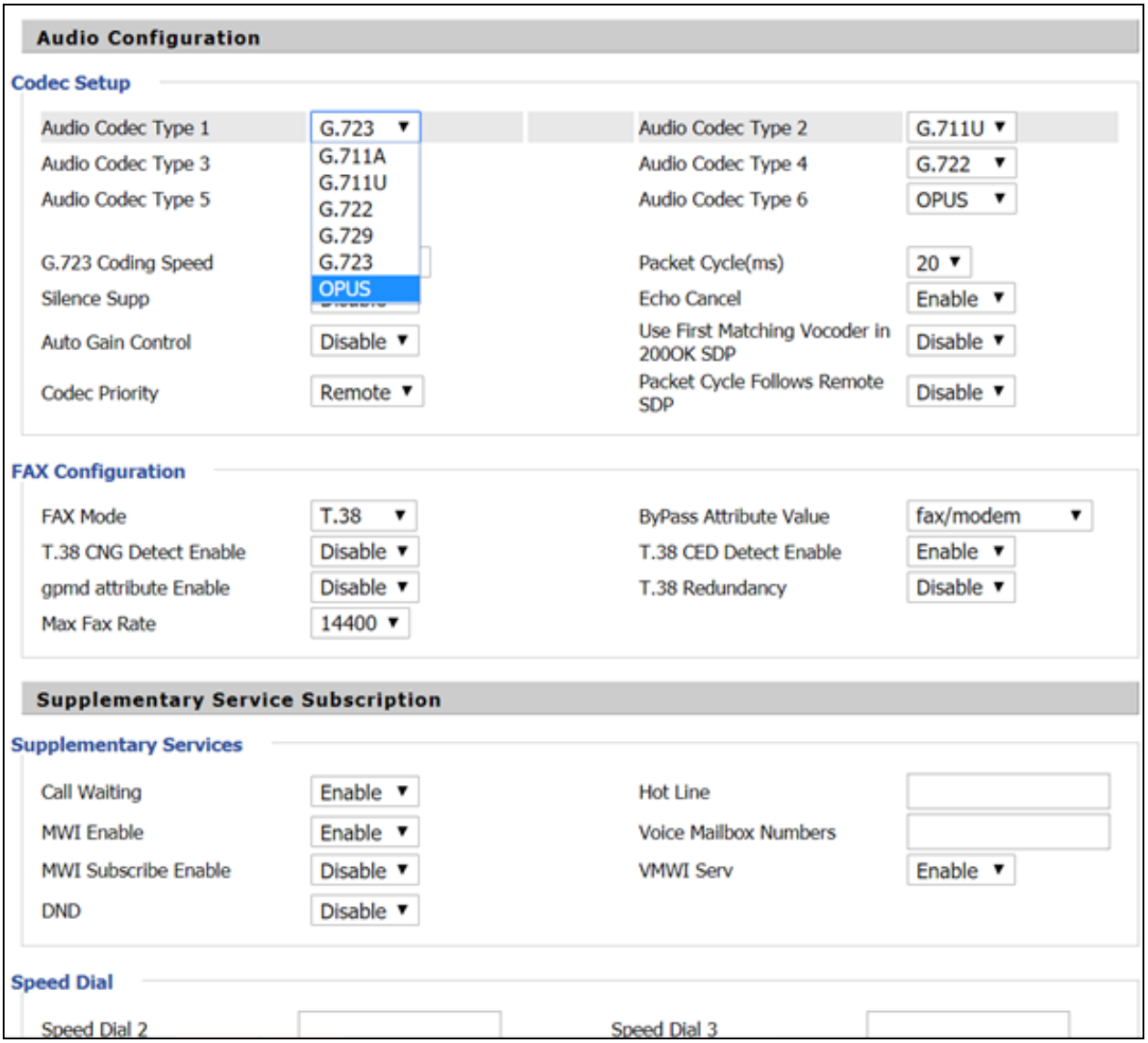


Table 47: SIP Account – Basic

Field Name	Description
Line Enable	Enable/Disable the line.
Peer To Peer	Enable/Disable PEER to PEER. If enabled, SIP-1 will not send register request to SIP server; but in Status/ SIP Account Status webpage, Status is Registered; lines 1 can dial out, but the external line number cannot dial line1.
Proxy Server	The IP address or the domain of SIP Server
Outbound Server	The IP address or the domain of Outbound Server
Backup Outbound Server	The IP address or the domain of Backup Outbound Server
Proxy port	SIP Service port, default is 5060
Outbound Port	Outbound Proxy's Service port, default is 5060
Backup Outbound Port	Backup Outbound Proxy's Service port, default is 5060
Display Name	The number will be displayed on LCD
Phone Number	Enter telephone number provided by SIP Proxy
Account	Enter SIP account provided by SIP Proxy
Password	Enter SIP password provided by SIP Proxy

Audio Configuration

Table 48: Audio configuration



Field Name	Description
Audio Codec Type1	Choose the audio codec type from G.711U, G.711A, G.722, G.729, G.723, OPUS
Audio Codec Type2	Choose the audio codec type from G.711U, G.711A, G.722, G.729, G.723, OPUS
Audio Codec Type3	Choose the audio codec type from G.711U, G.711A, G.722, G.729, G.723, OPUS

Field Name	Description
Audio Codec Type4	Choose the audio codec type from G.711U, G.711A, G.722, G.729, G.723, OPUS
Audio Codec Type5	Choose the audio codec type from G.711U, G.711A, G.722, G.729, G.723, OPUS
G.723 Coding Speed	Choose the speed of G.723 from 5.3kbps and 6.3kbps
Packet Cycle	The RTP packet cycle time, default is 20ms
Silence Support	Enable/Disable silence support.
Echo Cancel	Enable/Disable echo cancel. By default, it is enabled.
Auto Gain Control	Enable/Disable auto gain.
T.38 Enable	Enable/Disable T.38
T.38 Redundancy	Enable/Disable T.38 Redundancy
T.38 CNG Detect Enable	Enable/Disable T.38 CNG Detect
gpmd attribute Enable	Enable/Disable gpmd attribute.

Supplementary Service Subscription

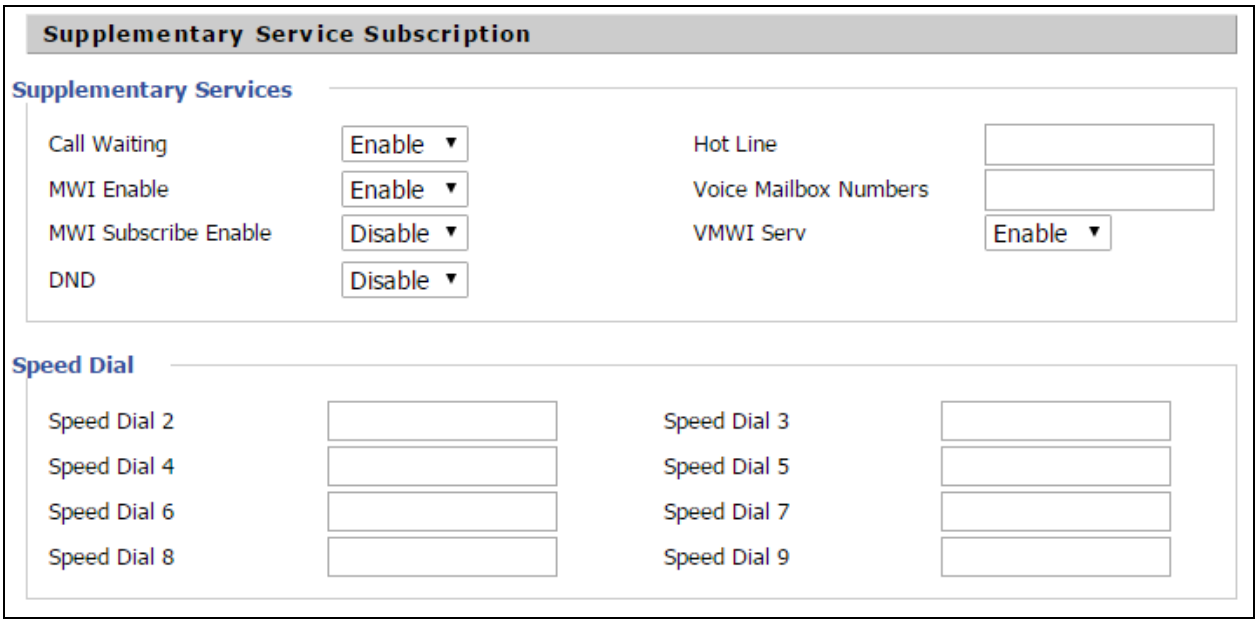


Table 49: Supplementary service

Field Name	Description
Call Waiting	Enable/Disable Call Waiting
Hot Line	Fill in the hotline number.

Field Name	Description
	Pickup handset or press hands-free or headset button, the device will dial out the hotline number automatically.
MWI Enable	Enable/Disable MWI (indicates message waiting). If the user needs to user voice mail, please enable this feature.
MWI Subscribe Enable	Enable/Disable MWI Subscribe
Voice Mailbox Numbers	Fill in the voice mailbox phone number, Asterisk platform, for example, its default voice mail is *97
VMWI Serv	Enable/Disable VMWI service.
DND	Enable/Disable DND (do not disturb). If enable, any phone call cannot arrive at the device; default is disable.
Speed Dial	Enter the speed dial phone numbers. Dial *74 to active speed dial function. Then press the speed dial numbers, for example, press 2, phone dials 075526099365 directly.

Advanced

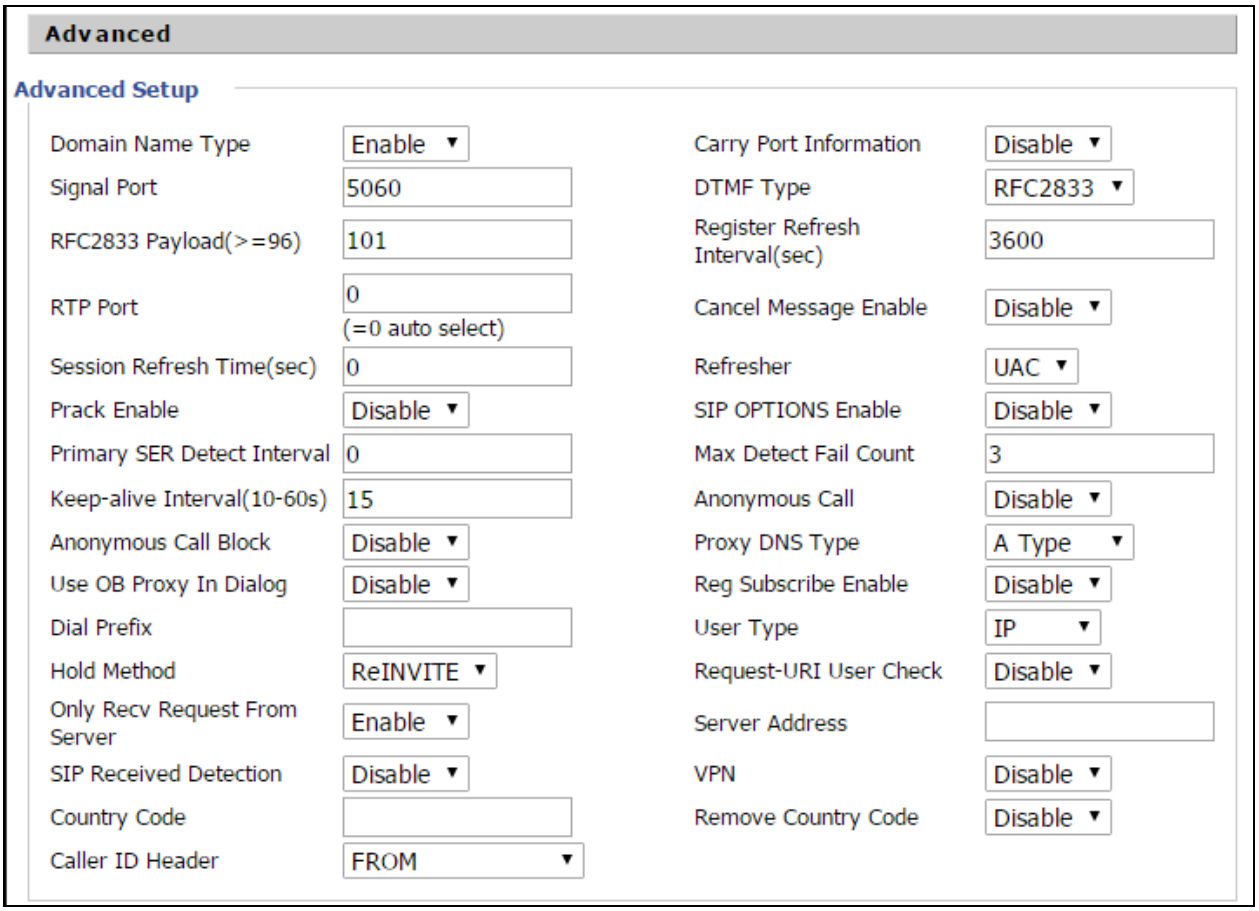


Table 50: Advanced

Field Name	Description
Domain Name Type	If or not use domain name in the SIP URI.
Carry Port Information	If or not carry port information in the SIP URI.
Signal Port	The local port of SIP protocol, default is 5060.
DTMF Type	Choose the DTMF type from Inbound, RFC2833 and SIP INFO.
RFC2833 Payload (>=96)	User can use the default setting.
Register Refresh Interval	The interval between two normal Register messages. You can use the default setting.
RTP Port	Set the port to send RTP. The device will select one idle port for RTP if you set “0”; otherwise use the value which user sets.

Field Name	Description
Cancel Message Enable	When you set enable, an unregistered message will be sent before registration, while you set disable, unregistered message will not be sent before registration. You should set the option for different Proxy.
Session Refresh Time(sec)	Time interval between two sessions, you can use the default settings.
Refresher	Choose refresher from UAC and UAS.
Prack Enable	Enable/Disable prack.
SIP OPTIONS Enable	When you set enable, the device will send SIP-OPTION to the server, instead of sending periodic Hello message. The sending interval is Keep-alive interval.
Primary SER Detect Interval	Test interval of the primary server, the default value is 0, it represents disable.
Max Detect Fail Count	Interval of detection of the primary server fail; the default value is 3, it means that if detect 3 times fail; the device will no longer detect the primary server.
Keep-alive Interval(10-60s)	The interval that the device will send an empty packet to proxy.
Anonymous Call	Enable/Disable anonymous call.
Anonymous Call Block	Enable/Disable anonymous call block.
Proxy DNS Type	Set the DNS server type, choose from A type and DNS SRV.
Use OB Proxy In Dialog	If or not use OB Proxy In Dialog.
Reg Subscribe Enable	If enable, subscribing will be sent after registration message, if not enable, do not send subscription.
Dial Prefix	The number will be added before your telephone number when making calls.
User Type	Choose the User Type from IP and Phone.
Hold Method	Choose the Hold Method from ReINVITE and INFO.
Request-URI User Check	Enable/Disable the user request URI check.
Only Recv request from server	Enable/Disable the only receive request from server.
Server Address	The IP address of SIP server.
SIP Received Detection	Enable/Disable SIP Received Detection, if enable, use it to confirm the public network address of the device.

Preferences

Volume Settings

Table 51: Volume settings

Field Name	Description
Handset Input Gain	Adjust the handset input gain from 0 to 7.
Handset Volume	Adjust the output gain from 0 to 7.

Regional

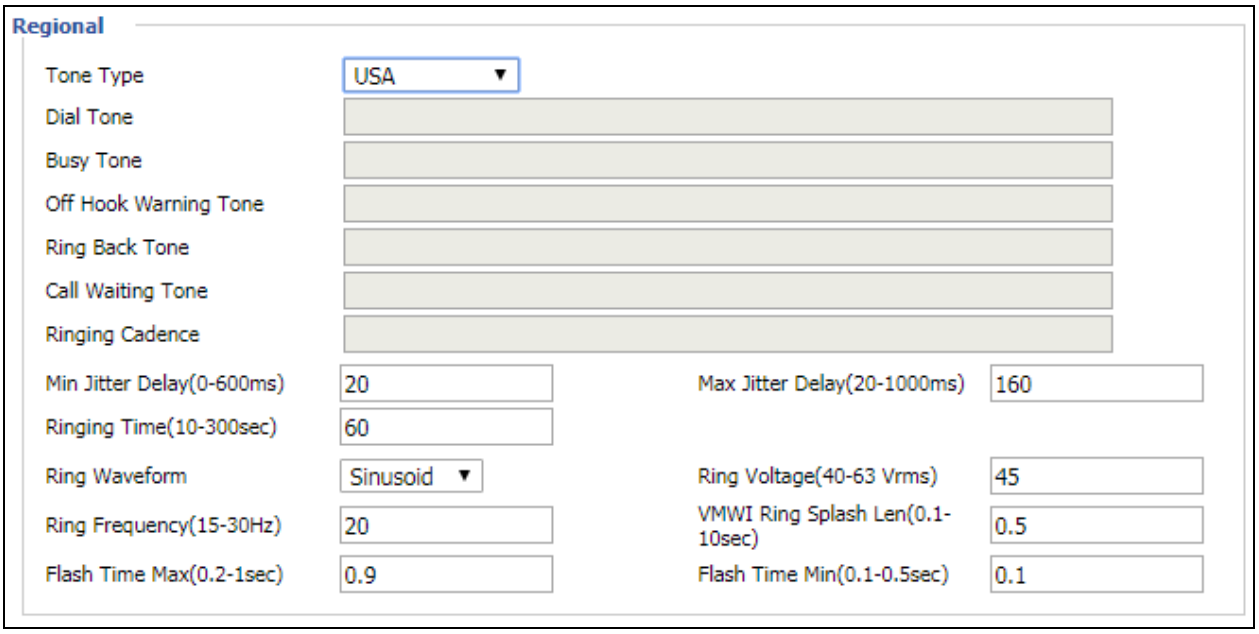


Table 52: Regional

Field Name	Description
Tone Type	Choose tone type as UK, China, US, Hong Kong and so on. A sample Tone Type for UK is shown below:

<table>
<tr><th>Field Name</th><th>Description</th></tr>
<tr><td></td><td>
<table>
<tr><th>COUNTRY/PARAMETER</th><th>VALUE</th></tr>
<tr><td>U.K</td><td></td></tr>
<tr><td>Dial tone</td><td>350@-19;440@-19;30(*/0/1+2)</td></tr>
<tr><td>Busy tone</td><td>400@-19;30(.375/.375/1)</td></tr>
<tr><td>Ring Back Tone</td><td>400@-19;450@-19;10(0.4/0.2/1+2,0.4/2.0/1+2)</td></tr>
<tr><td>On-hook Voltage</td><td>50Vrms</td></tr>
<tr><td>Impedance Maching</td><td>370+620||310nF</td></tr>
<tr><td>Ring Voltage</td><td>55Vrms</td></tr>
</table>
Note
Currently, selecting a particular country does not load the correct Ringing parameters as per standard. If standard based ringing cadence is desired, then the user has to select Custom option from the drop-down list and enter the country specific parameters manually.
</td></tr>
<tr><td>Dial Tone</td><td>Dial Tone</td></tr>
<tr><td>Busy Tone</td><td>Busy Tone</td></tr>
<tr><td>Off Hook Warning Tone</td><td>Off Hook warning tone</td></tr>
<tr><td>Ring Back Tone</td><td>Ring back tone</td></tr>
<tr><td>Call Waiting Tone</td><td>Call waiting tone</td></tr>
<tr><td>Ringing Cadence</td><td>The ringing pattern heard by the dialer before the called party picks up the call.</td></tr>
<tr><td>Min Jitter Delay</td><td>The Min value of home gateway’s jitter delay, home gateway is an adaptive jitter mechanism</td></tr>
<tr><td>Max Jitter Delay</td><td>The Max value of home gateway’s jitter delay, home gateway is an adaptive jitter mechanism</td></tr>
<tr><td>Ringing Time</td><td>How long cnPilot r190V/r190W/r200/r200P Routers will ring when there is an incoming call</td></tr>
<tr><td>Ring Waveform</td><td>Select regional ring waveform, options are Sinusoid and Trapezoid, the default Sinusoid</td></tr>
<tr><td>Ring Voltage</td><td>Set ringing voltage, the default value is 70</td></tr>
<tr><td>Ring Frequency</td><td>Set ring frequency, the default value is 25</td></tr>
</table>

Field Name	Description
VMWI Ring Splash Len(sec)	Set the VMWI ring splash length, default is 0.5s
Flash Time Max (sec)	Set the Max value of the device's flash time, the default value is 0.9
Flash Time Min (sec)	Set the Min value of the device's flash time, the default value is 0.1

Features and Call Forward

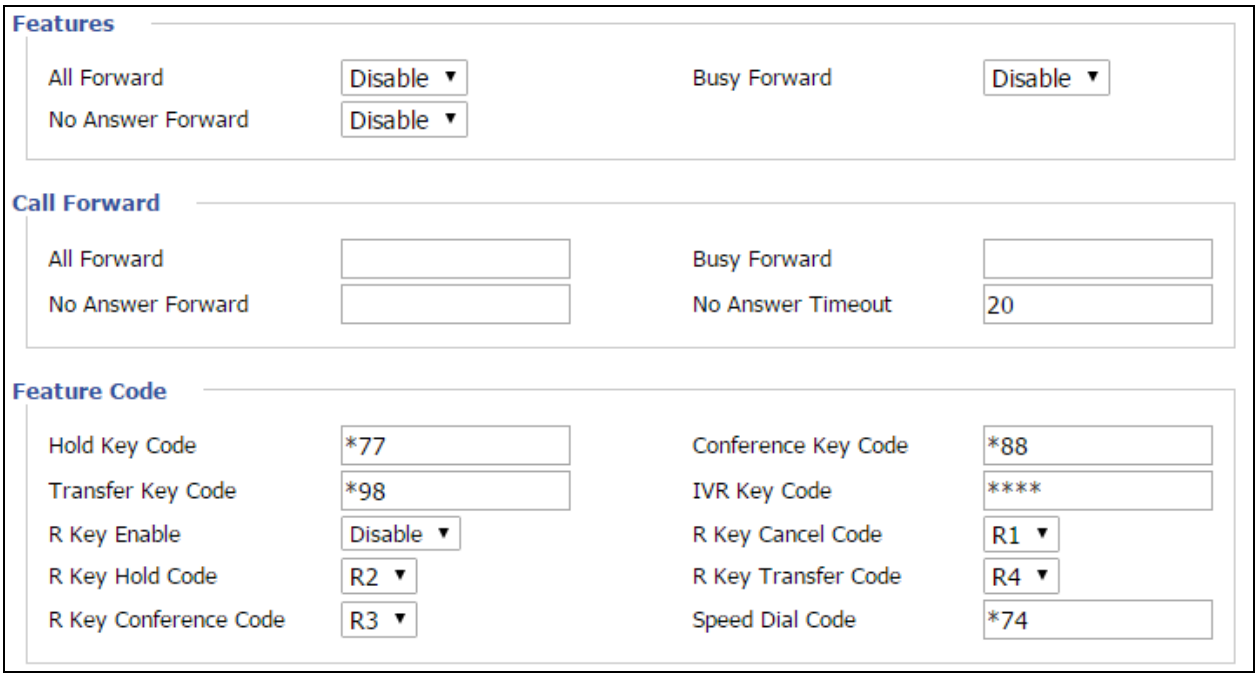
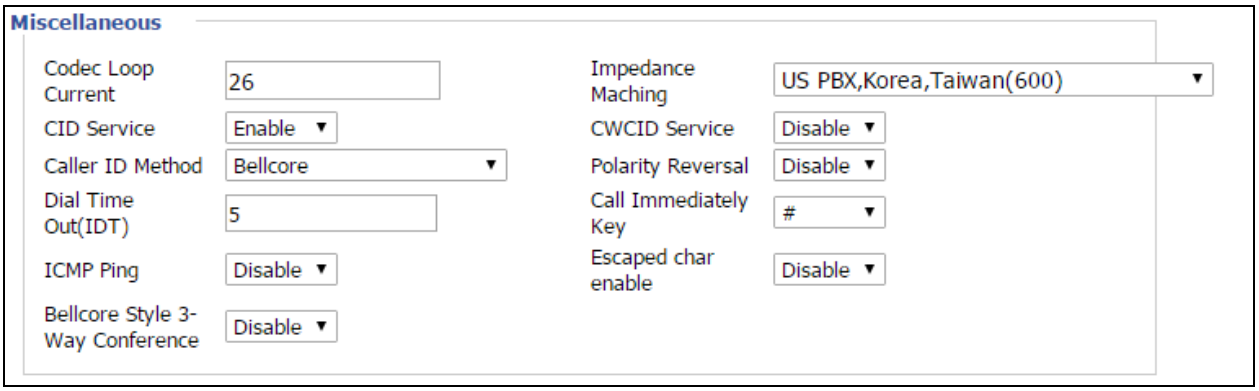


Table 53: Features and call forward

Field Name		Description
Features	All Forward	Enable/Disable forward all calls
	Busy Forward	Enable/Disable busy forward
	No Answer Forward	Enable/Disable no answer forward
Call Forward	All Forward	Set the target phone number for all forward. The device will forward all calls to the phone number immediately when there is an incoming call.
	Busy Forward	The phone number which the calls will be forwarded to when line is busy

Field Name		Description
	No Answer Forward	The phone number which the call will be forwarded to when there's no answer
	No Answer Timeout	The seconds to delay forwarding calls, if there is no answer at your phone
Feature Code	Hold key code	Call hold signatures, default is *77
	Conference key code	Signature of the tripartite session, default is *88
	Transfer key code	Call forwarding signatures, default is *98
	IVR key code	Signatures of the voice menu, default is ****
	R key enable	Enable/Disable R key way call features
	R key cancel code	Set the R key cancel code, options are ranged from R1 to R9, default value is R1
	R key hold code	Set the R key hold code, options are ranged from R1 to R9, default value is R2
	R key transfer code	Set the R key transfer code, options are ranged from R1 to R9, default value is R4
	R key conference code	Set the R key conference code, options are ranged from R1 to R9, default value is R3
	Speed Dial Code	Speed dial code, default is *74

Miscellaneous



Warning

3-wire connection is not supported.

Table 54: Miscellaneous

Field Name	Description
Codec Loop Current	Set off-hook loop current, default is 26
Impedance Matching	Set impedance matching, default is US PBX, Korea, Taiwan (600)
CID service	Enable/Disable displaying caller ID; If enable, caller ID is displayed when there is an incoming call or it won't be displayed. Default is Enable
CWCID Service	Enable/Disable CWCID. If enable, the device will display the waiting call's caller ID, or it won't display. Default is Disable
Dial Time Out	How long cnPilot Home Router will sound dial out tone
Call Immediately Key	Choose call immediately key form * or #
ICMP Ping	Enable/Disable ICMP Ping. If enable this option, home gateway will ping the SIP Server every interval time, otherwise, It will send "hello" empty packet to the SIP Server.
Escaped char enable	Open special character translation function; if enable, when you press the # key, it will be translated to 23%, when disable, it is just #

FXS2

The settings of FXS2 are the same as FXS1. See FXS1 on page FXS1.

Voice calls

Making a call

Calling phone or extension numbers

To make a phone or extension number call:

- Both ATA and the other VoIP device (such as another ATA or other SIP products) must have public IP addresses, or
- Both ATA and the other VoIP device (such as another ATA or other SIP products) are on the same LAN using private or public IP addresses, or
- Both ATA and the other VoIP device (such as another ATA or other SIP products) can be connected through a router using a public or private IP addresses.

To make a call, pick up the analog phone or turn on the speakerphone on the analog phone, enter the extension or phone number directly, end with #.

Direct IP calls

Direct IP calling allows two phones, that is, an ATA with an analog phone and another VoIP Device, to talk to each other without a SIP proxy. VoIP calls can be made between two phones if:

- Both ATA and the other VoIP device (such as another ATA or other SIP products) have public IP addresses, or
- Both ATA and the other VoIP device (such as another ATA or other SIP products) are on the same LAN using private or public IP addresses, or
- Both ATA and the other VoIP device (such as another ATA or other SIP products) can be connected through a router using public or private IP addresses.

To make a direct IP call, pick up the analog phone or turn on the speakerphone on the analog phone, Input the IP address directly, with the end "#".

Call hold

While in conversation, pressing the "*77" to put the remote end on hold, then you hear the dial tone and the remote party hears hold tone at the same time.

Press "*77" again to release the previously hold state and resume the bi-directional media.

Blind transfer

Assume that call party A and party B are in conversation. Party A wants to Blind Transfer B to C then:

- Party A dials "*78" to get a dial tone, then dials party C's number, and then press immediately key # (or wait for 4 seconds) to dial out.
- A can hang up.

Attended transfer

Assume that call party A and B are in a conversation. A want to Attend Transfer B to C:

- Party A dials "*77" to hold the party B, when hear the dial tone, A dials C's number, then party A and party C are in conversation.
- Party A dials "*78" to transfer to C, then B and C now in conversation.
- If the transfer is not completed successfully, then A and B are in conversation again.

Conference

Assume that call party A and B are in a conversation. A want to add C to the conference:

- Party A dials "*77" to hold the party B, when hear the dial tone, A dial C's number, then party A and party C are in conversation.
- Party A dials "*88" to add C, then A and B, for conference.

Security

Filtering Setting

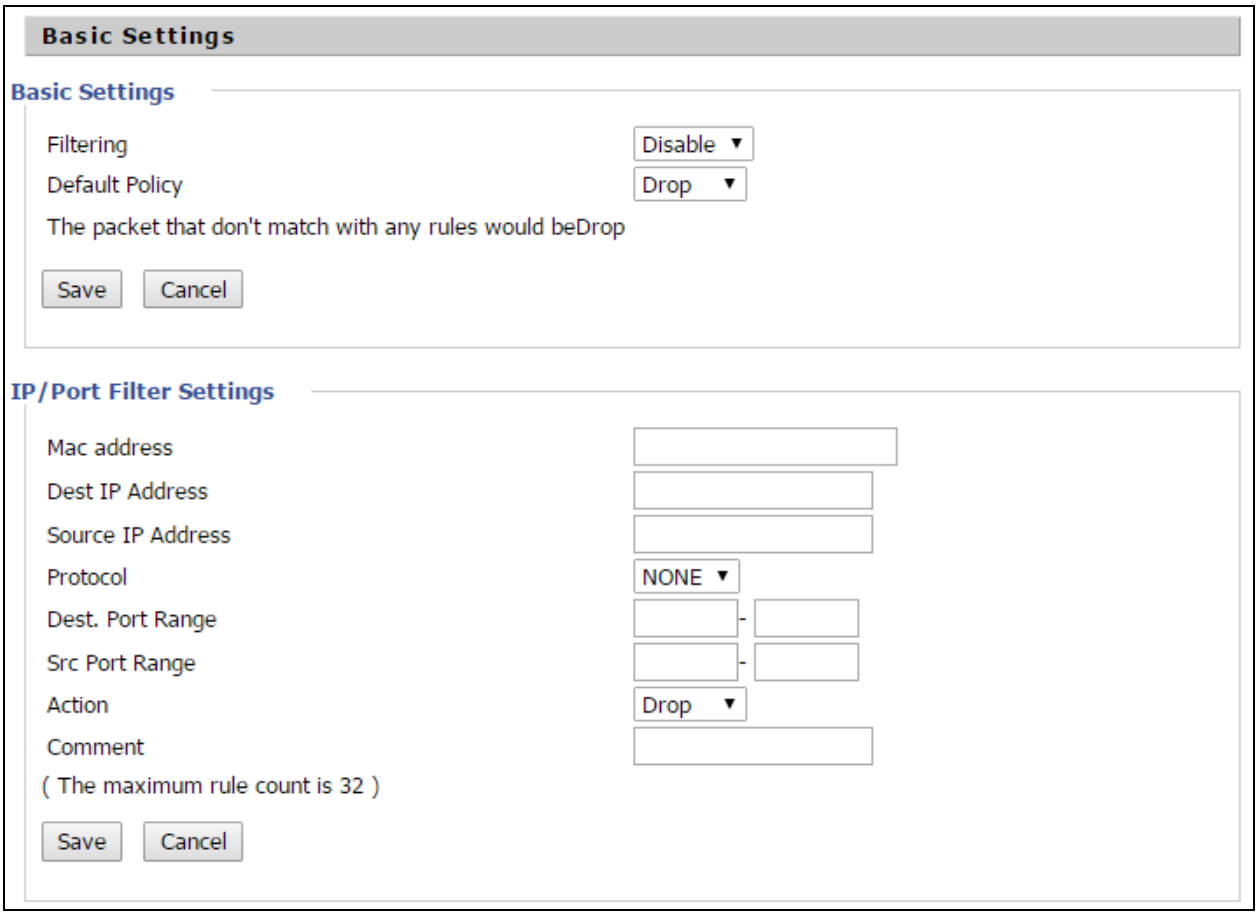


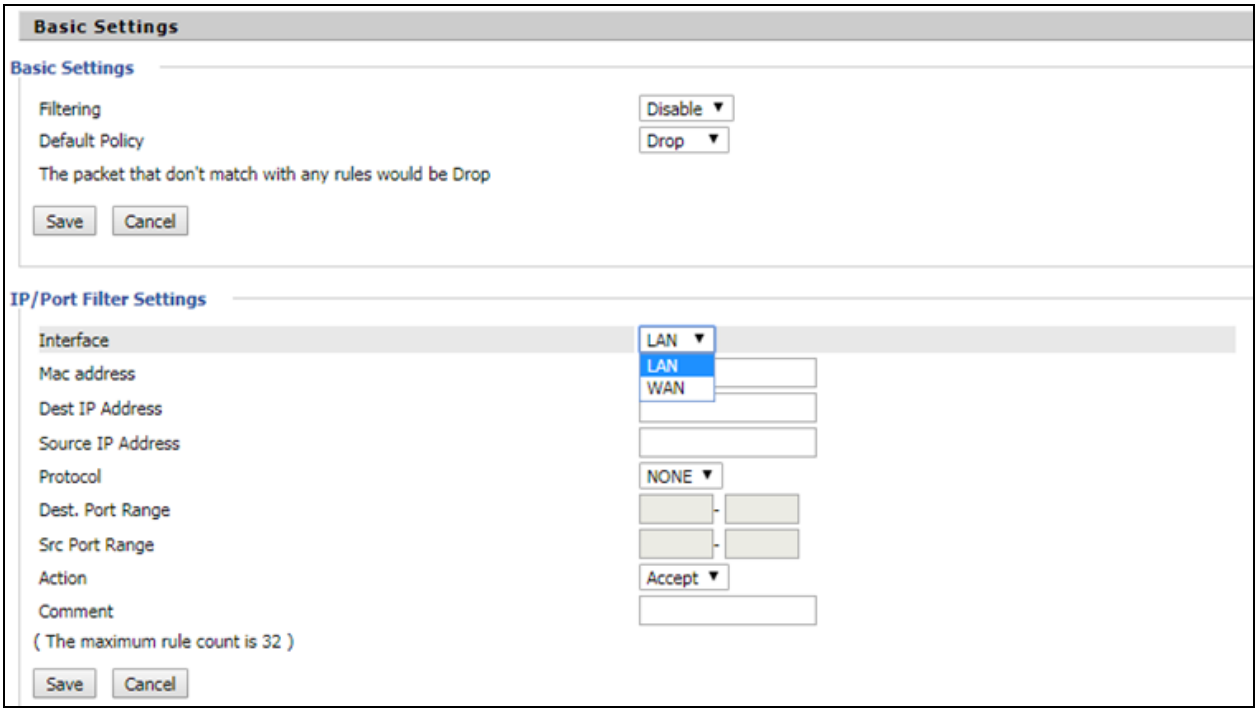
Table 55: Filtering setting

Field Name	Description
Filtering	Enable/Disable filter function
Default Policy	Choose to drop or accept filtered MAC addresses
Mac address	Add the Mac address filtering
Dest IP address	Destination IP address
Source IP address	Source IP address
Protocol	Select a protocol name, support for TCP, UDP and TCP/UDP
Dest. Port Range	Destination port ranges
Src Port Range	Source port range
Action	You can choose to accept or drop; this should be consistent with the default policy.

Field Name	Description
Comment	Add callout
Delete	Delete selected item

Content Filtering

Table 56: Content filtering



Field Name	Description
Filtering	Enable/Disable content Filtering
Default Policy	The default policy is to accept or to prohibit filtering rules
Current Webs URL Filters	List the URL filtering rules that already existed (blacklist)
Delete/Cancel	You can choose to delete or cancel the existing filter rules
Add a URL Filter	Add URL filtering rules
Add/Cancel	Click adds to add one rule or click cancel
Current Website Host Filters	List the keywords that already exist (blacklist)
Delete/Cancel	You can choose to delete or cancel the existing filter rules the existing keywords
Add a Host Filter (Keyword)	Add keywords
Add/Cancel	Click the Add or cancel

Application

UPnP

UPnP (Universal Plug and Play) supports zero-configuration networking and can automatically discover a variety of networked devices. When UPnP is enabled, the connected device can access the network, obtain an IP address, and convey performance information. If the network has a DHCP and DNS server, the connected device can automatically obtain DHCP and DNS services.
UPnP devices can be automatically added to the network without affecting previously connected devices.

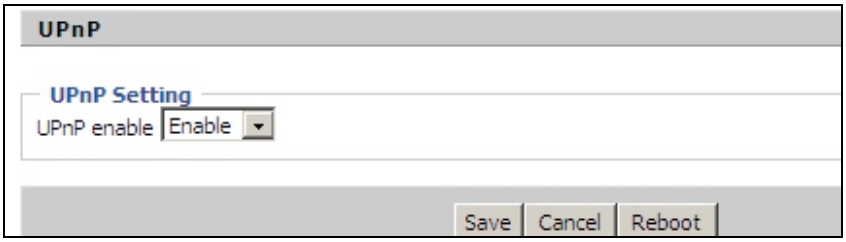


Table 57: UPnP

Field Name	Description
UPnP enable	Enable/Disable UPnP function.

IGMP

Multicast has ability to send the same data to multiple devices.

IP hosts use IGMP (Internet Group Management Protocol) report multicast group memberships to the neighboring routers to transmit data, at the same time, the multicast router use IGMP to discover which hosts belong to the same multicast group.

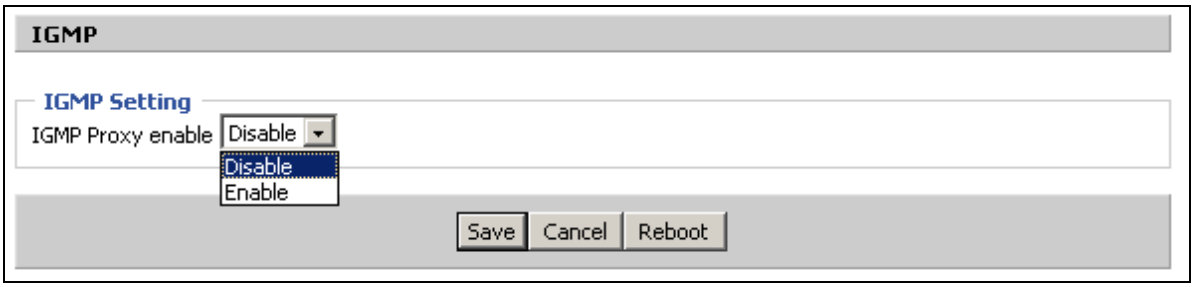


Table 58: IGMP

Field Name	Description
IGMP Proxy enable	Enable/Disable IGMP function.

Storage

Disk Management

The Disk Management page is used to manage the USB storage devices.

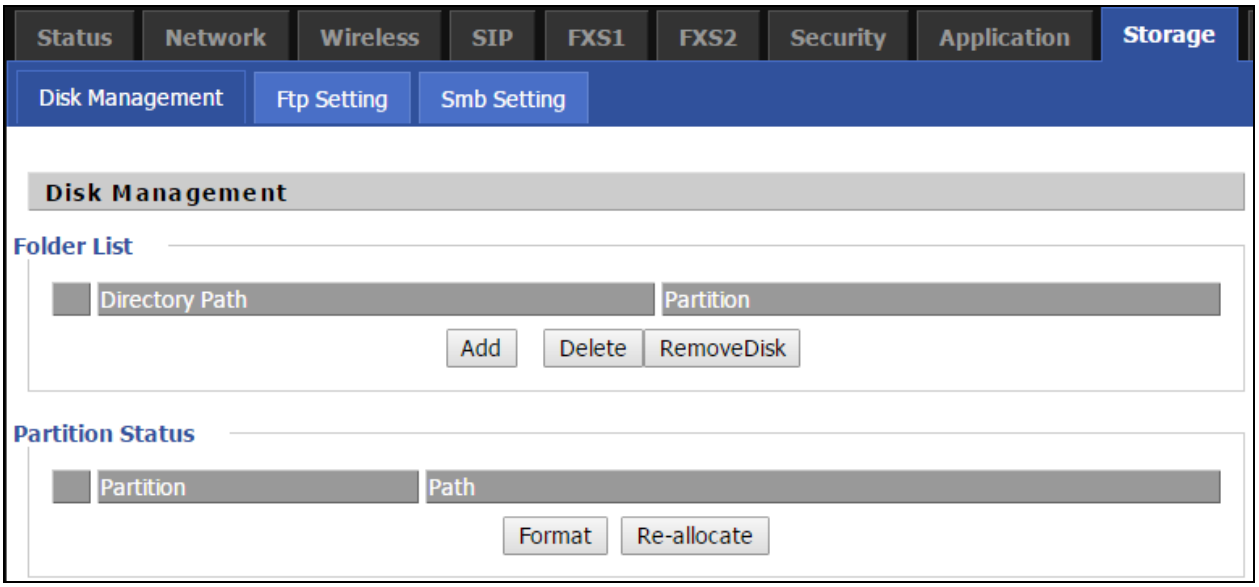


Table 59: Disk Management

Field Name	Description
Add	Adding files to the USB storage device
Delete	Remove the USB storage device file
Remove Disk	Transfer files within a USB storage device
Format	Format the USB storage device
Re-allocate	Reset the USB storage device

Note

Only **FAT/FAT32** USB drive formats are supported. Other file systems like **NTFS/EXT2/EXT3** will not be detected.

FTP Setting

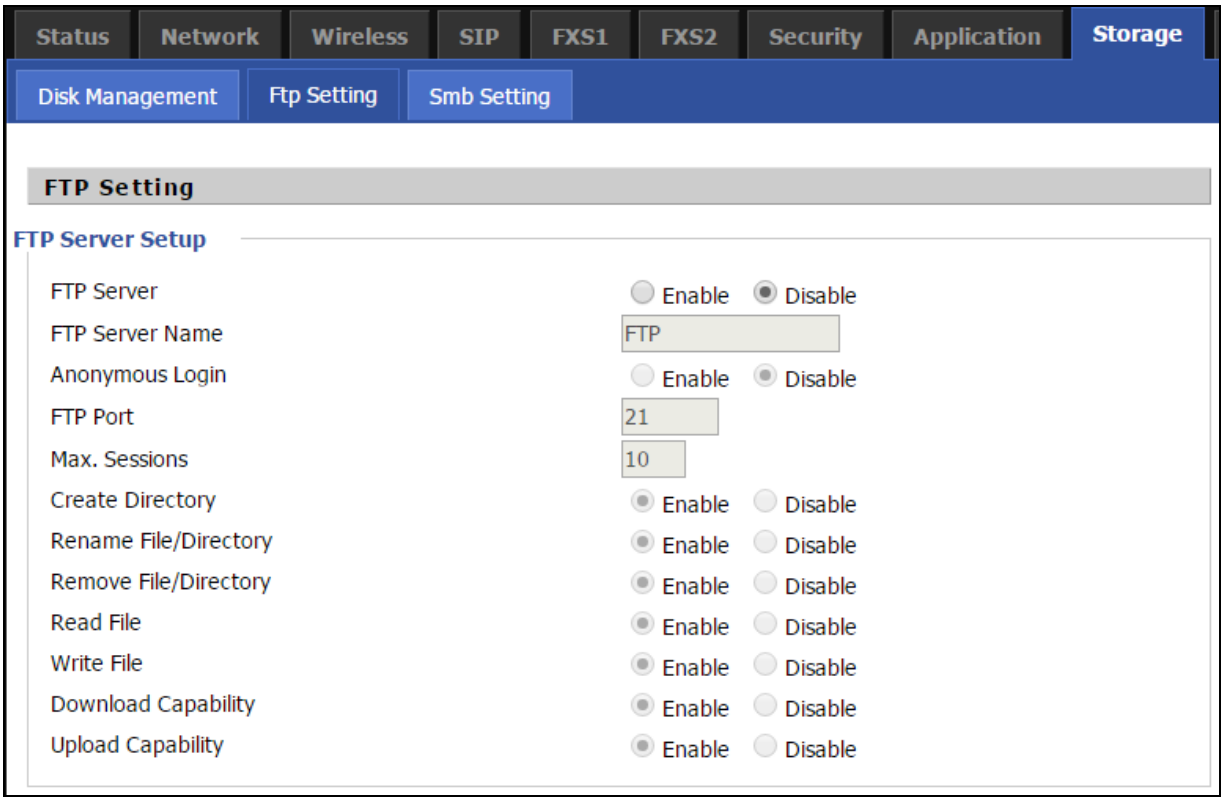


Table 60: FTP Setting

Field Name	Description
FTP Server	Enable/Disable FTP server
FTP Server Name	Set the FTP server name
Anonymous Login	If or not support anonymous login
FTP Port	Set FTP server port number
Max. Sessions	Maximum number of connections
Create Directory	Enable/Disable create directory
Rename File/Directory	Enable/Disable rename file/directory
Remove File/Directory	Enable/Disable transfer of files/directories
Read File	Enable/Disable read files
Write File	Enable/Disable write files
Download Capability	Enable/Disable download capability function.
Upload Capability	Enable/Disable upload capability function

Smb Setting

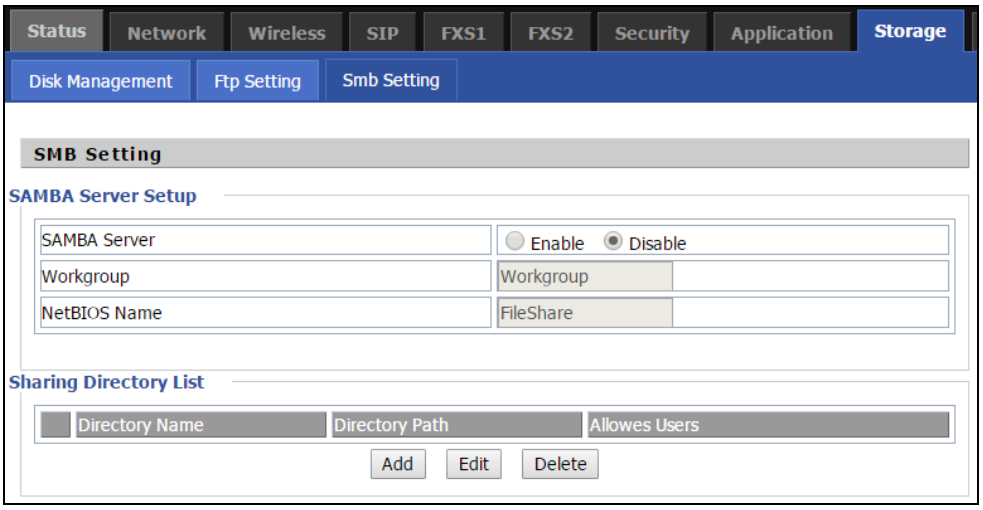


Table 61: Smb setting

Field Name	Description
SAMBA Server	Enable/Disable SAMBA server
Workgroup	Enter the working group
NetBIOS Name	Network basic input/output system name
Add	Add a shared file
Edit	Edit a shared file
Del	Delete a shared file
Add	Add a shared file
Edit	Edit a shared file
Del	Delete a shared file

Administration

The Administration page is used to manage the device. You can configure the Time/Date, password, web access, system log, and associated configuration TR069.

Management

Save Config File

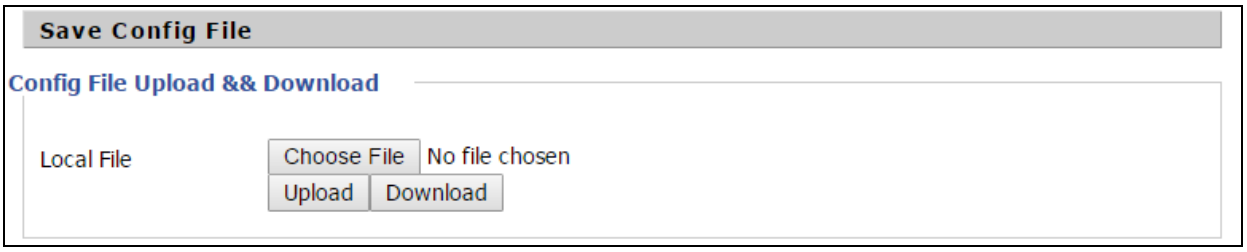
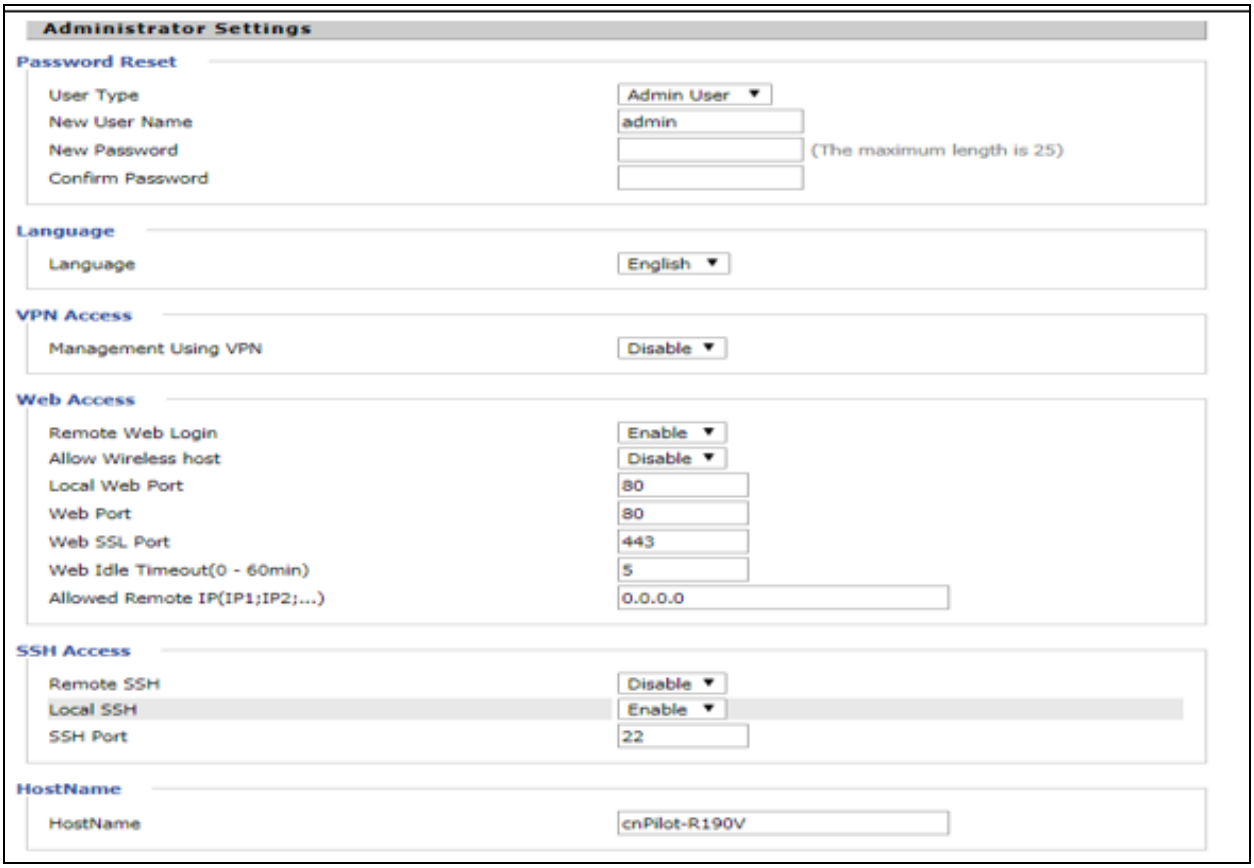


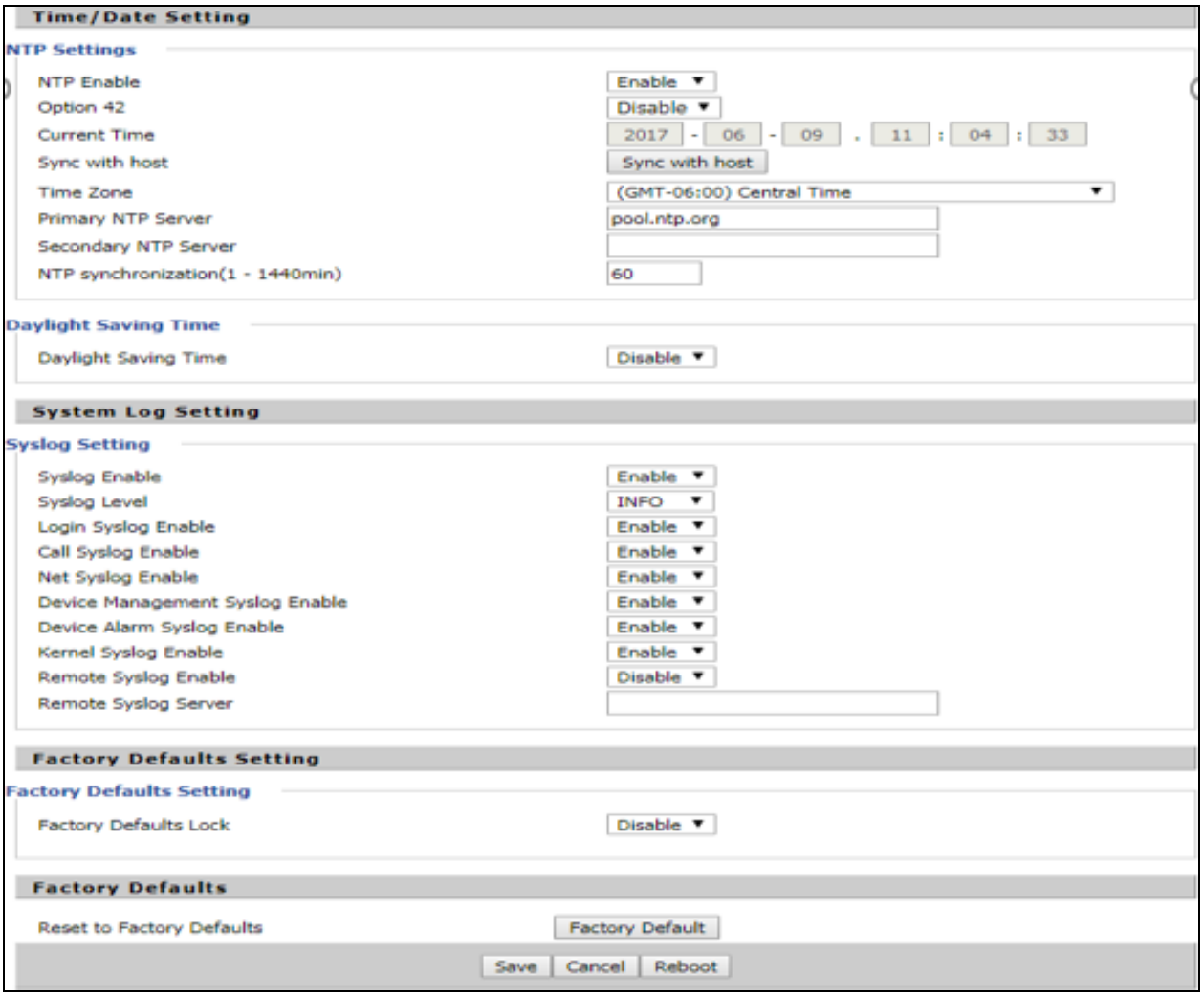
Table 62: Save Config File

Field Name	Description
Config file upload and download	**Upload**: Click browse and select file in the local. Press the **Upload** button to begin uploading files.
	Download: Click **Download** and select the path to download the configuration file.

Administrator settings

Table 63: Administrator settings





Field Name	Description
User type	Choose the user type from admin user and normal user and basic user.
New User Name	You can modify the user name, set up a new user name.
New Password	Input the new password.
Confirm Password	Input the new password again.
Language	Select the language for the web, the device supports the languages such as Chinese, English, and Spanish.
Management using VPN	
Remote Web Login	Enable/Disable remote Web login.
Allow wireless host	To allow all the wireless clients connected to the cnPilot Home Router to access the management interface.

Field Name	Description
Local Web Port	Set the port value which is used to login from Internet port and PC port, default is 80.
Web Idle timeout	Set the Web Idle timeout time. The webpage can be logged out after Web Idle Timeout without any operation.
Allowed Remote IP (IP1, IP2,...)	Set the IP from which a user can login the device remotely.
SSH	Enable/Disable telnet.

Enabling Mangement access for wireless clients

To allow all the wireless clients connected to the cnPilot Home Router to access the management interface:

1. Navigate to **Administrator** tab.
2. Enable **Allow Wireless Host** option under **Web Access**.

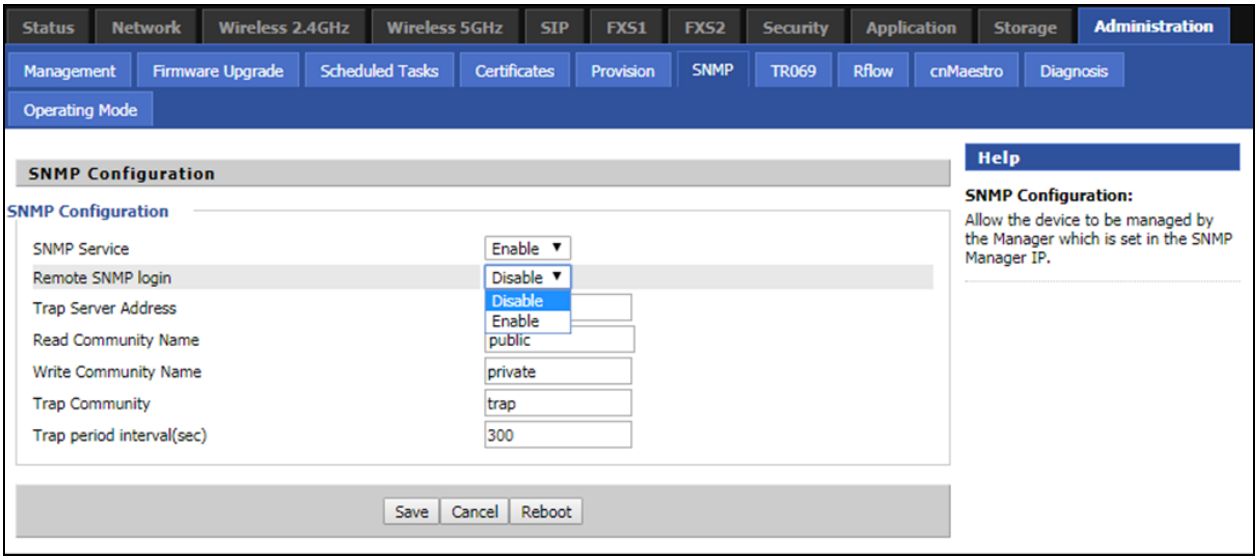
The user must have administrator permissions to make this change.

Enabling SNMP access over WAN

To enable SNMP access over WAN:

1. Navigate to **Administrator** > **SNMP** tab.
2. Enable **Remote SNMP Login** option.

The user must have administrator permissions to make this change.



NTP settings

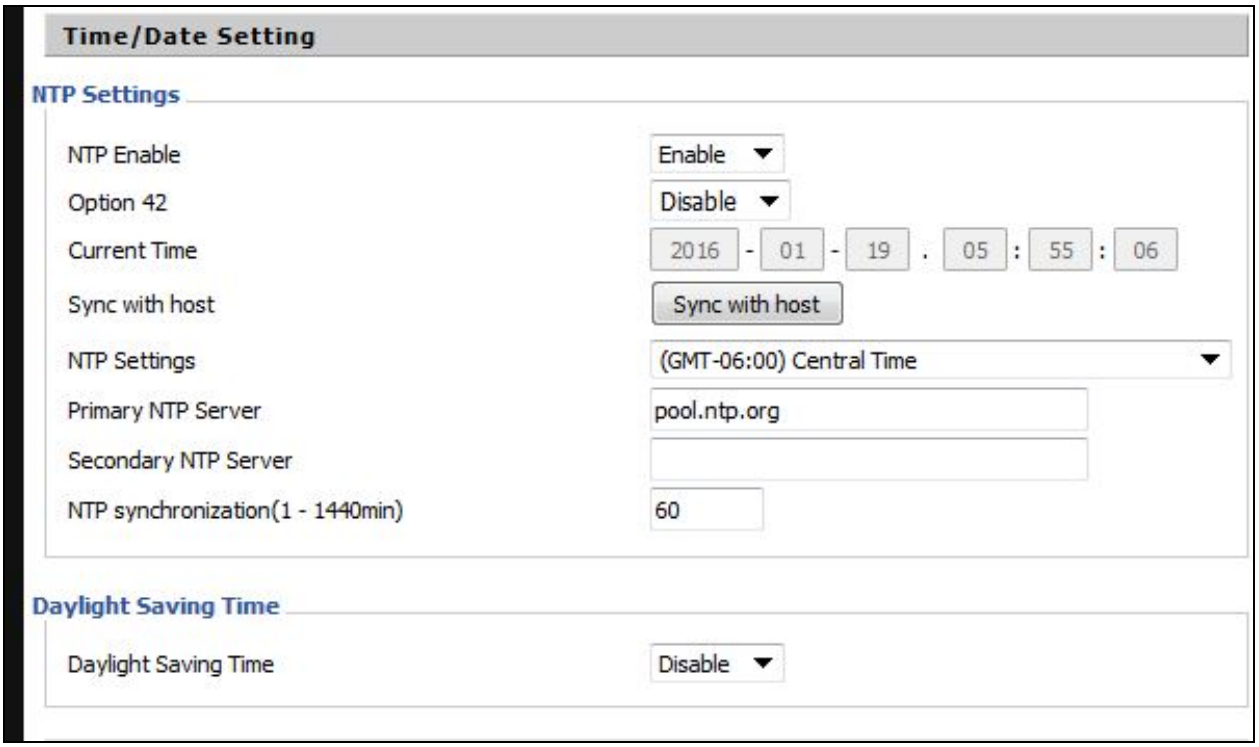


Table 64: NTP settings

Field Name	Description
NTP Enable	Enable/Disable NTP
Option 42	Enable/Disable DHCP option 42. This option specifies a list of the NTP servers available to the client by IP address
Current Time	Display current time
NTP Settings	Setting the Time Zone
Primary NTP Server	Primary NTP server's IP address or domain name
Secondary NTP Server	Options for NTP server's IP address or domain name
NTP synchronization	NTP synchronization cycle, cycle time can be 1 to 1440 minutes in anyone, the default setting is 60 minutes

Daylight Saving Time

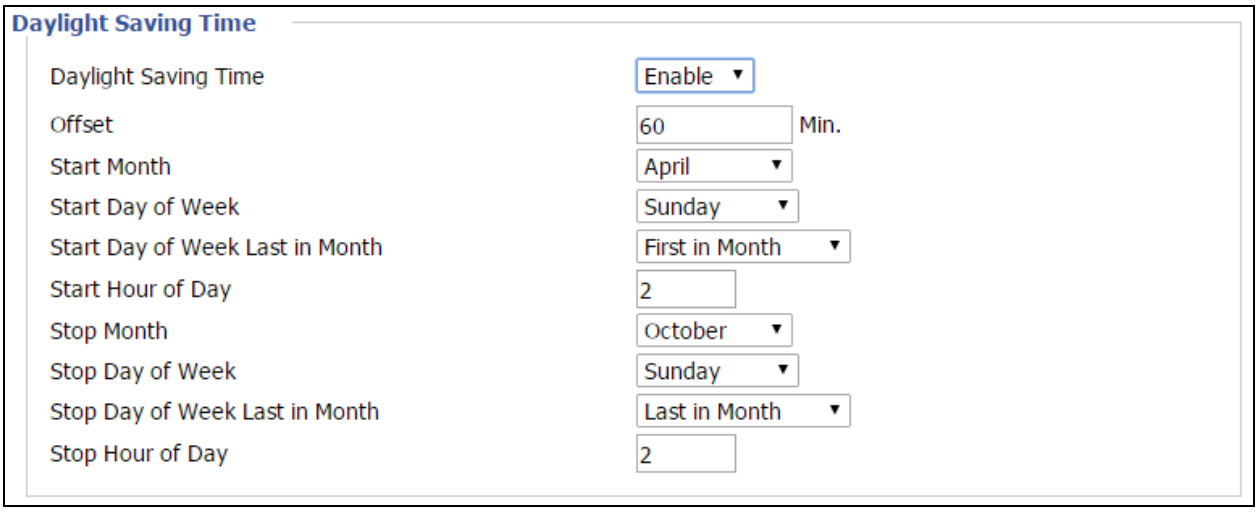


Table 65: Daylight Saving Time

Steps	Procedure
1	Enable Daylight Savings Time.
2	Set value of offset for Daylight Savings Time
3	Set starting Month/Week/Day/Hour in Start Month/Start Day of Week Last in Month/Start Day of Week/Start Hour of Day, analogously set stopping Month/Week/Day/Hour in Stop Month/Stop Day of Week Last in Month/Stop Day of Week/Stop Hour of Day.
4	Press Saving button to save and press Reboot button to active changes.

System Log Setting

Table 66: System log Setting

Field Name	Description
Syslog Enable	Enable/Disable syslog function
Syslog Level	Select the system log, there is INFO and Debug two grades, the Debug INFO can provide more information.

Field Name	Description
Remote Syslog Enable	Enable/Disable remote syslog function.
Remote Syslog server	Add a remote server IP address.
Syslog Enable	Enable/Disable syslog function
Syslog Level	Select the system log, there is INFO and Debug two grades, the Debug INFO can provide more information.

Factory Defaults Setting

Table 67: Factory Defaults Setting

Description
With this lock enabled, user cannot factory reset the box using the hardware switch.

Factory Defaults

Table 68: Factory Defaults

Description
Click Factory Default to restore the cnPilot Home Router to factory settings.

Firmware upgrade

This page is used to upgrade the device Firmware.

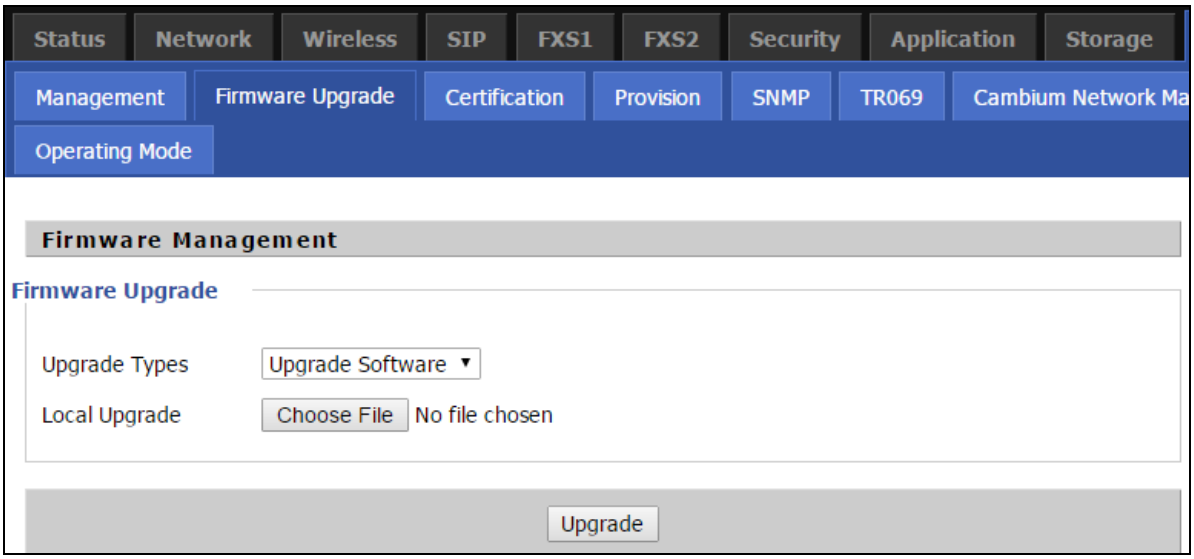


Table 69: Firmware upgrade

Description
Select upgrade file type from Image File and Dial Rule.
Click **Browse** to browse the file.
Click Upgrade to start upgrading

Note

Firmware cannot be downgraded to below 4.7.2, for the devices with OUI **BC:A9:93** and later MAC address.

Provision

Provisioning allows cnPilot Home Router to auto-upgrade and auto-configure devices which support TFTP, HTTP and HTTPs.

- Before testing or using TFTP, user should have tftp server and upgrading file and configuring file.
- Before testing or using HTTP, user should have http server and upgrading file and configuring file.
- Before testing or using HTTPS, user should have https server and upgrading file and configuring file and CA Certificate file (should same as https server's) and Client Certificate file and Private key file

User can upload a CA Certificate file and Client Certificate file and Private Key file in the Security page.

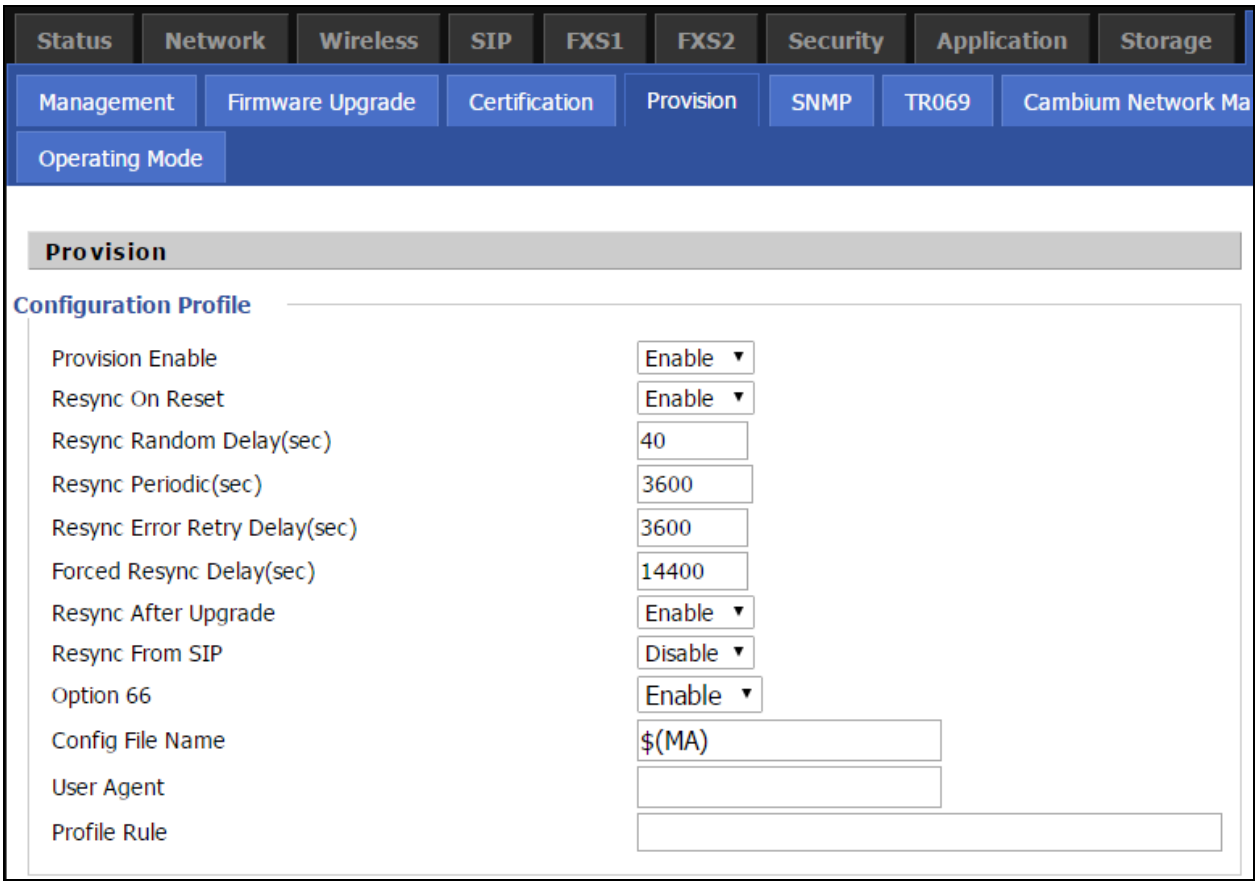


Table 70: Provision

Field Name	Description
Provision Enable	Enable provision or not
Resync on Reset	Enable re-sync after restart or not
Resync Random Delay(sec)	Set the maximum delay for the request of synchronization file. The default is 40
Resync Periodic(sec)	If the last resync was failure, cnPilot r190V/r190W/r200/r200P Routers will retry resync after the “Resync Error Retry Delay” time, default is 3600s
Resync Error Retry Delay(rec)	Set the periodic time for resync, default is 3600s
Forced Resync Delay(sec)	If it’s time to resync, but cnPilot r190V/r190W/r200/r200P Router is busy now, in this case, cnPilot r190V/r190W/r200/r200P Router will wait for a period time, the longest is “Forced Resync Delay”, default is 14400s, when the time over, cnPilot r190V/r190W/r200/r200P Router will be forced to re-sync
Resync After Upgrade	Enable firmware upgrade after re-sync or not. The default is Enabled

Field Name	Description
Resync From SIP	Enable/Disable re-sync from SIP
Option 66	It is used for In-house provision mode only. When use TFTP with option 66 to realize provisioning, user must input right configuration file name in the web page. When disable Option 66, this parameter has no effect
Config File Name	It is used for In-house provision mode only. When use TFTP with option 66 to realize provisioning, user must input right configuration file name in the web page. When disable Option 66, this parameter has no effect
Profile Rule	URL of profile provision file Note that the specified file path is relative to the TFTP server's virtual root directory.

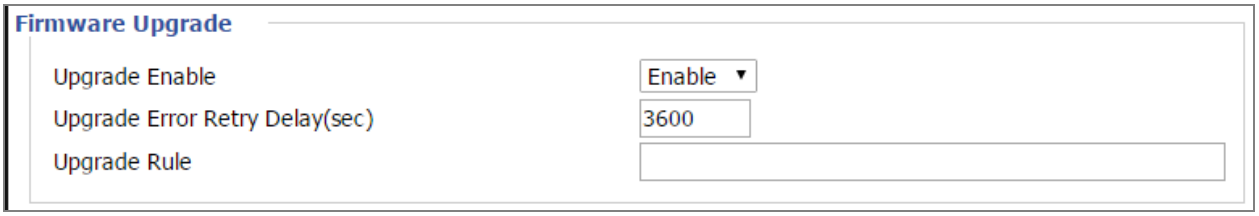


Table 71: Firmware Upgrade

Field Name	Description
Upgrade Enable	Enable firmware upgrade via provision or not
Upgrade Error Retry Delay(sec)	If the last upgrade fails, cnPilot r190V/r190W/r200/r200P Routers will try upgrading again after "Upgrade Error Retry Delay" period, default is 3600s
Upgrade Rule	URL of upgrade file

SNMP

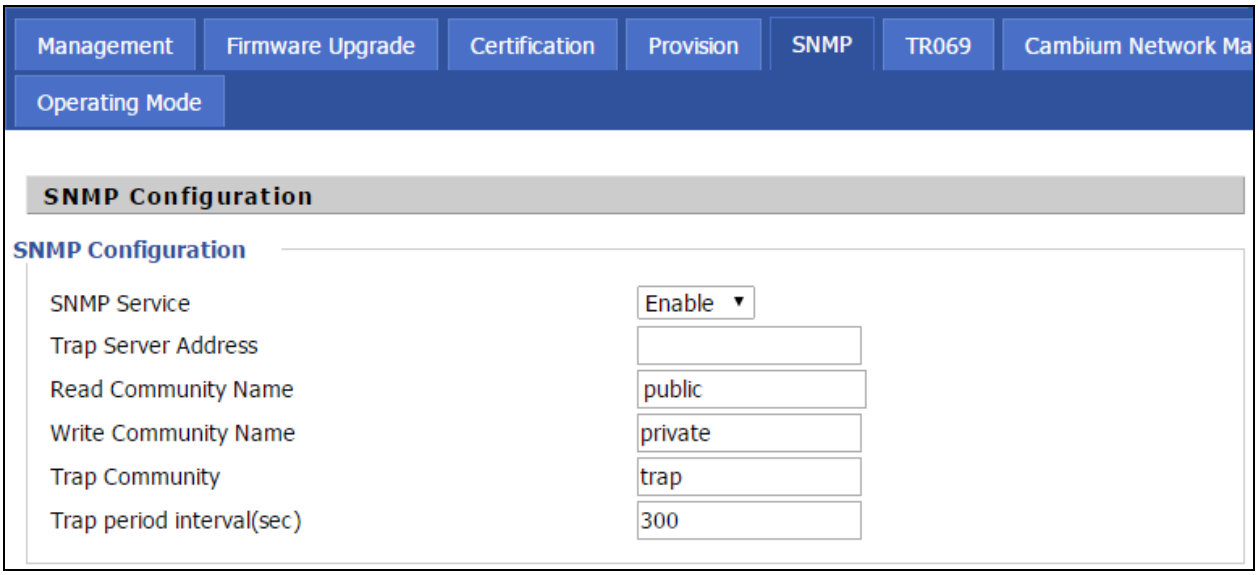


Table 72: SNMP

Field Name	Description
SNMP Service	Enable or Disable the SNMP service
Trap Server Address	Enter the trap server address for sending SNMP traps
Read Community Name	String value that is used as a password to request information via SNMP from the device
Write Community Name	String value that is used as a password to write configuration values to the device via SNMP
Trap Community	String value used as a password for retrieving traps from the device
Trap period interval (sec)	The interval for which traps are sent from the device

TR-069

TR-069 provides the possibility of auto configuration of internet access devices and reduces the cost of management. TR-069 (short for Technical Report 069) is a DSL Forum technical specification entitled CPE WAN Management Protocol (CWMP). It defines an application layer protocol for remote management of end-user devices. Using TR-069, the terminals establish connection with the Auto Configuration Servers (ACS) and get configured automatically.

Device Configuration using TR-069

The TR-069 configuration page is available under Administration menu.

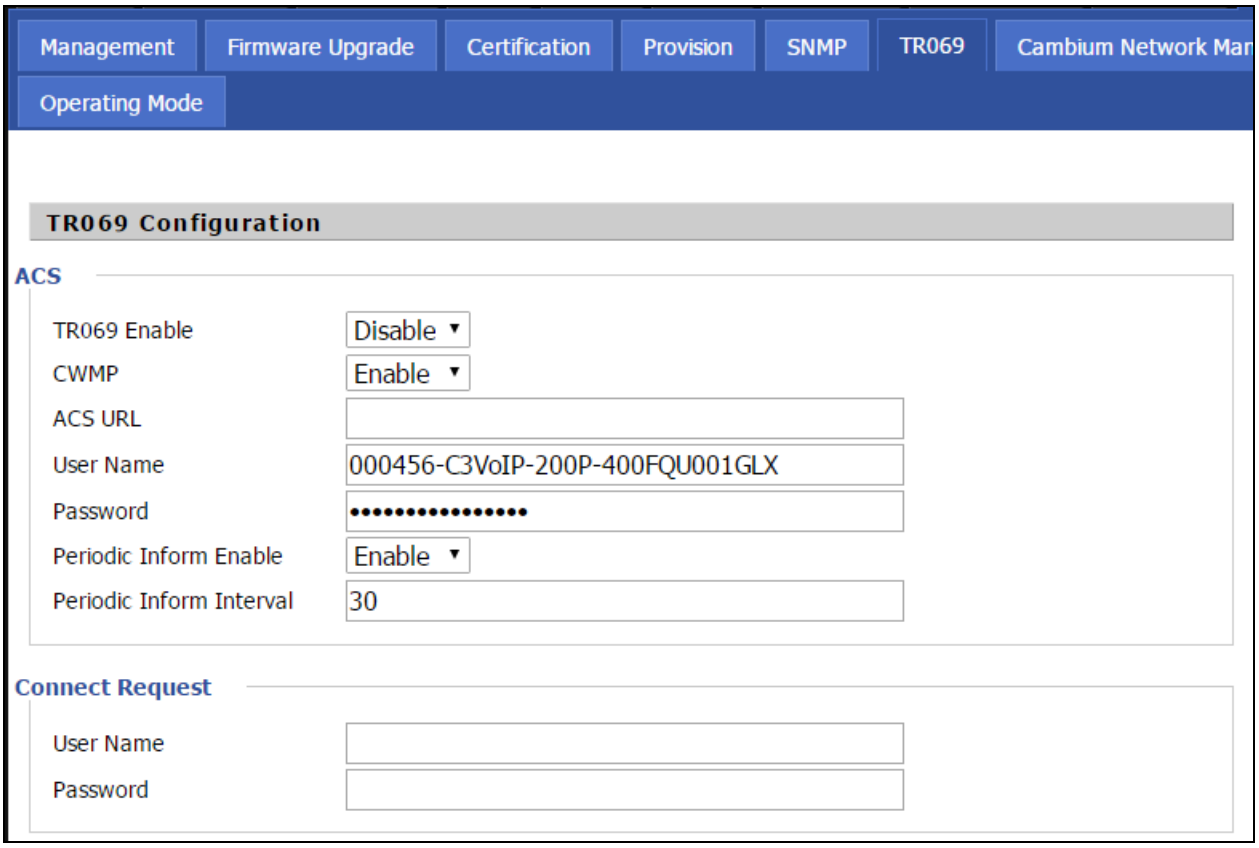


Table 73: TR069

Field Name	Description
ACS parameters	
TR069 Enable	Enable or Disable TR069
CWMP	Enable or Disable CWMP
ACS URL	ACS URL address
User Name	ACS username
Password	ACS password
Periodic Inform Enable	Enable the function of periodic inform or not. By default, it is Enabled.
Periodic Inform Interval	Periodic notification interval with the unit in seconds. The default value is 43200s.
Connect Request parameters	
User Name	The username used to connect the TR069 server to the DUT.
Password	The password used to connect the TR069 server to the DUT.

TR-069 Profile

Under nodes base on TR098, TR104 and TR111.

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   {"DeviceSummary", },
   {"LANDeviceNumberOfEntries", },
   {"WANDeviceNumberOfEntries", },
  {"DeviceInfo", },
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      {"ManufacturerOUI", },
      {"ModelName", },
      {"Description", },
      {"ProductClass", },
      {"SerialNumber", },
      {"HardwareVersion", },
      {"SoftwareVersion", },
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      {"ProvisioningCode", },
      {"UpTime", },
      {"DeviceLog", },
   {"", },

   {"ManagementServer", },
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      {"Password", },
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      {"PeriodicInformTime", },
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      {"ConnectionRequestURL", },
      {"ConnectionRequestUsername", },
      {"ConnectionRequestPassword", },
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{"MaximumResponseTime", },
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{"DownloadDiagnostics", },

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//    {"TotalBytesReceived", },
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    {"TCPOpenResponseTime", },
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    {"EOMTime", },
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    {"NTPServer2", },
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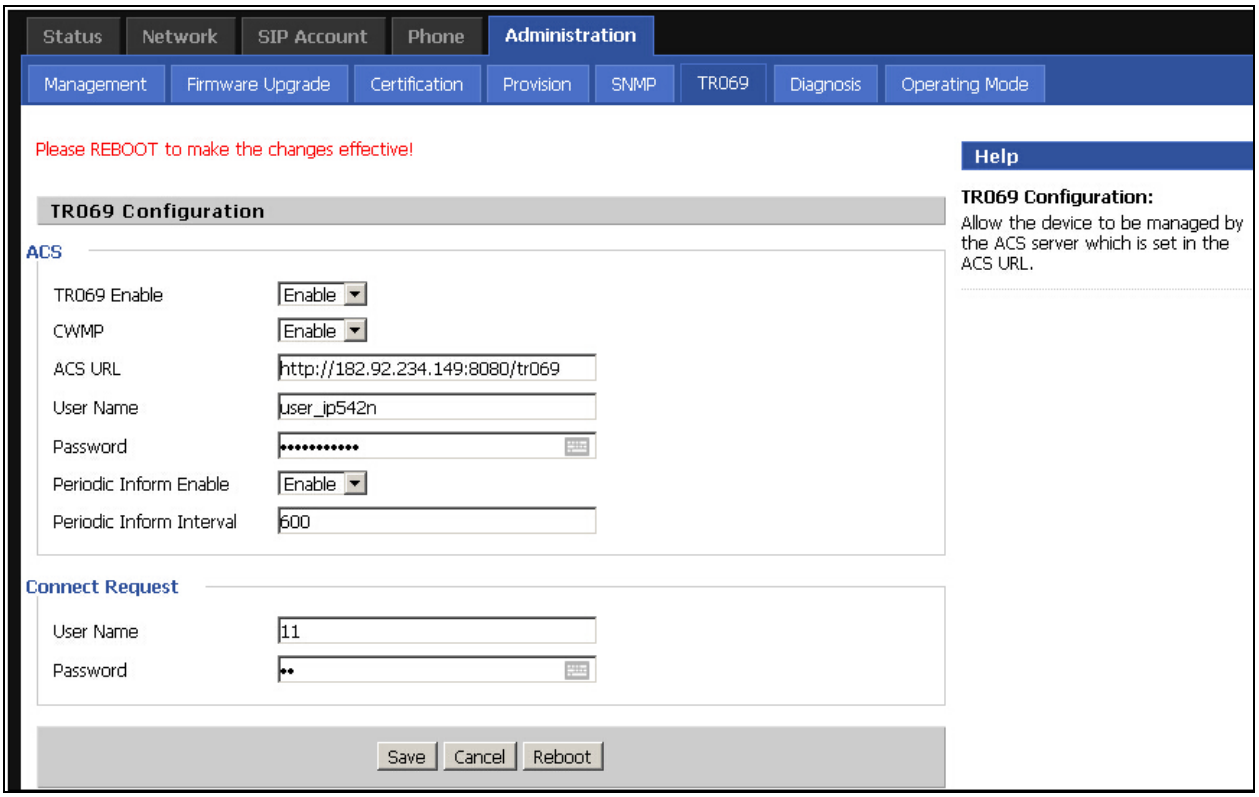
```

Firmware Upgrade

Under is firmware upgrading operation on **FreeACS**.

Equipment connection configure



Scheduled Tasks

In this page, the user can set time to automatically turned ON or OFF the Wi-Fi, Reboot, or restart PPPoE at a moment.

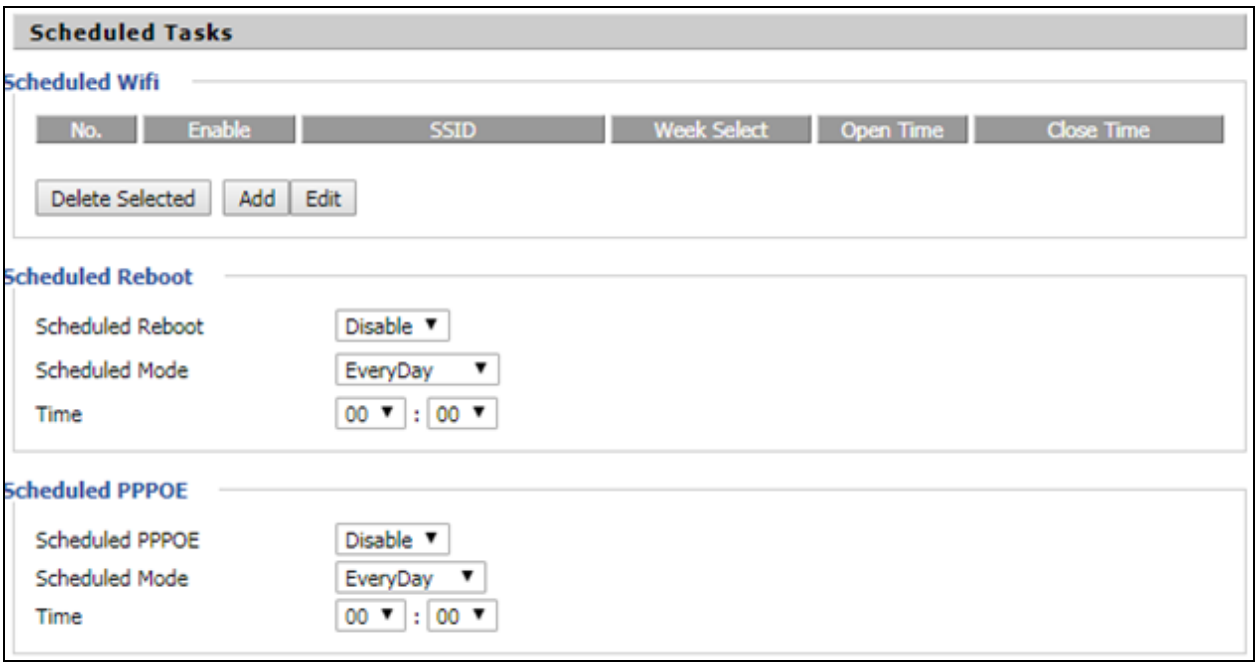


Table 74: Scheduled Tasks

Field Name	Description
Scheduled Wi-Fi	Select the Wi-Fi and click Edit to set the timings
Scheduled Reboot	Set values for Scheduled Reboot, Scheduled Mode, and Time.
Scheduled PPPoE	Set values for Scheduled PPPoE, Scheduled Mode, and Time

Diagnosis

In this page, user can do packet trace, ping test and traceroute test to diagnose the device's connection status.

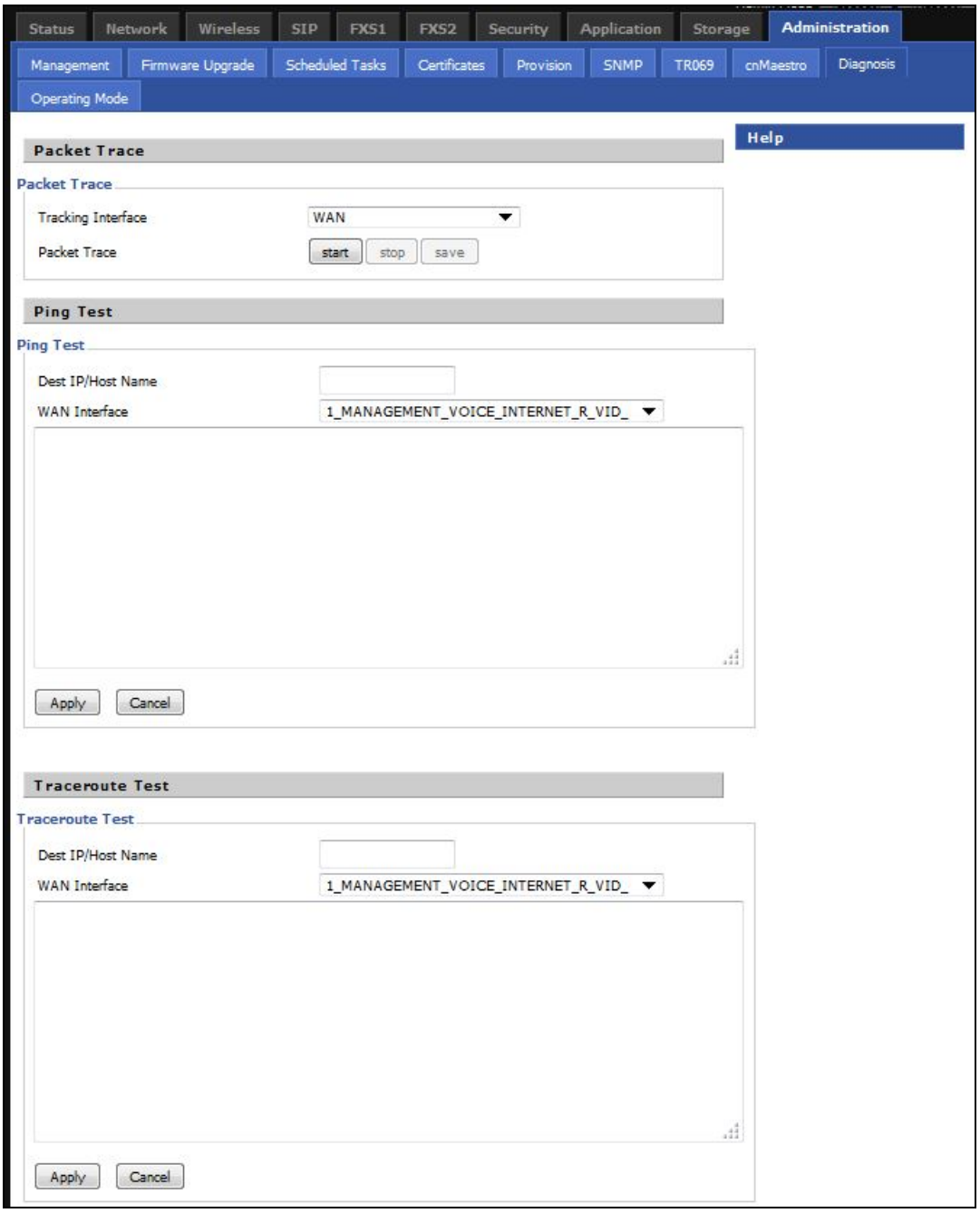
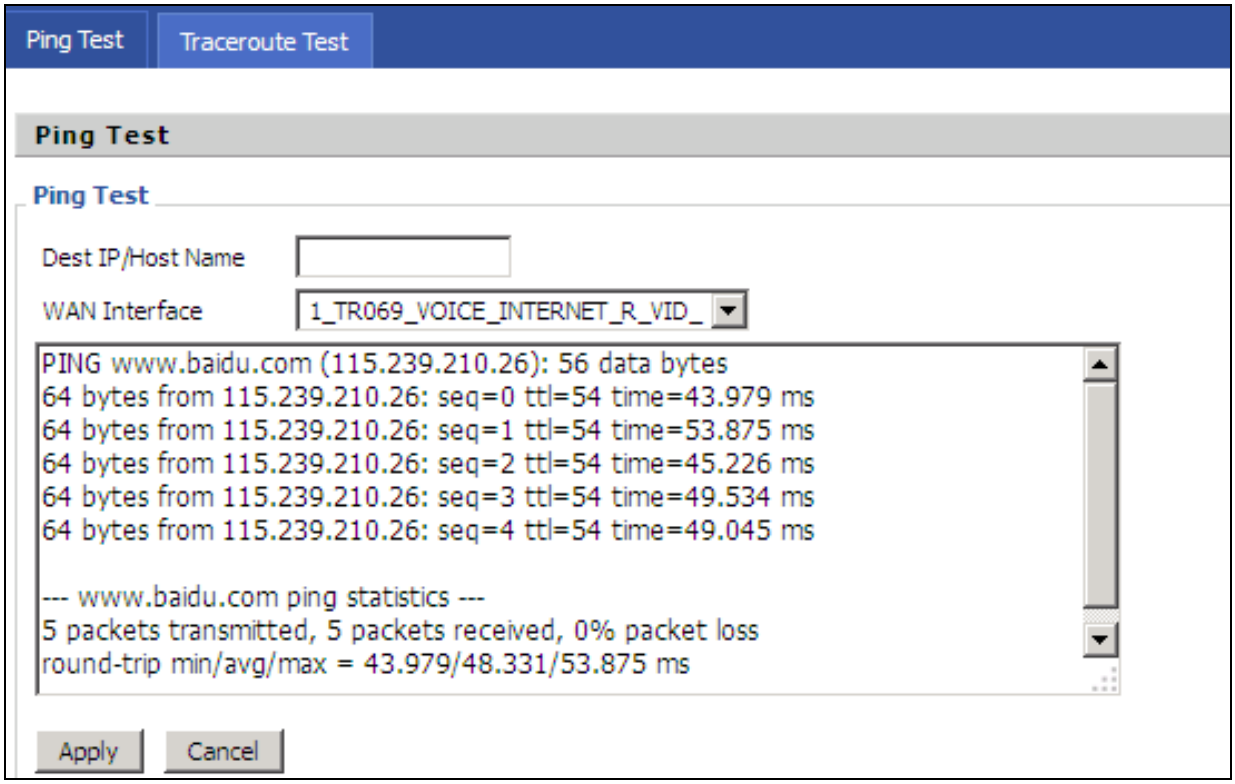


Table 75: Diagnosis

Description
Packet Trace Users can use the packet trace feature to intercept packets which traverse the device. Click the Start button to start home gateway tracking and keep refreshing the page until the message trace shows to stop, click the Save button to save captured packets.
Ping Test

Description
Enter the destination IP or host name, and then click Apply, device will perform ping test.



Traceroute Test

Enter the destination IP or host name, and then click Apply, device will perform traceroute test.

Operating Mode

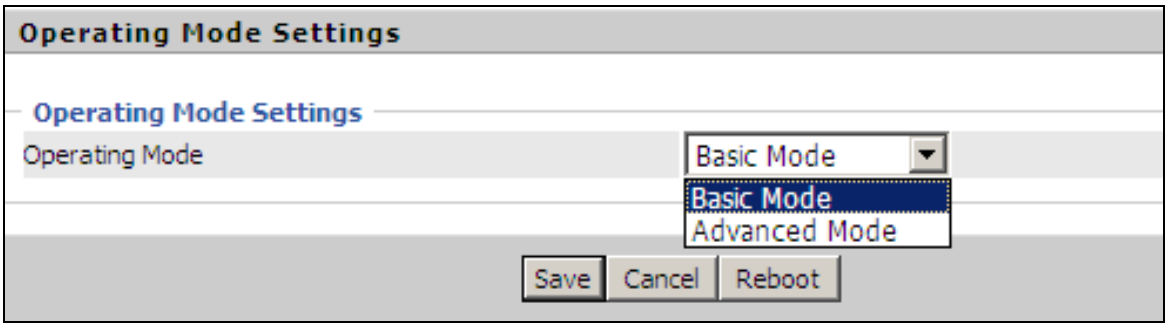


Table 76: Operating mode

Description
Choose the Operation Mode as Basic Mode or Advanced Mode (Default). In Basic mode, multi WAN configuration is not allowed and the device can be configured either as a simple NAT or Bridge device.

System Log

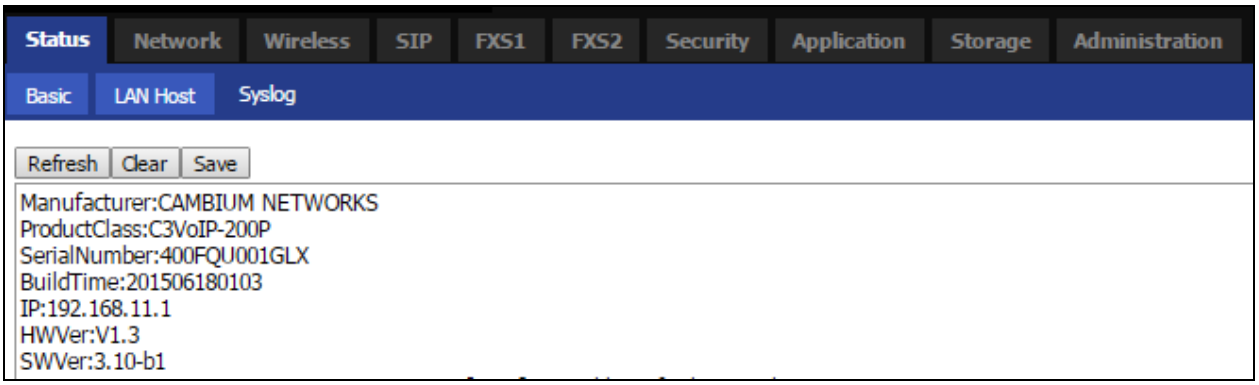


Table 77: System log

Description
If you enable the system log in Status/syslog webpage, you can view the system log in this webpage.

Logout

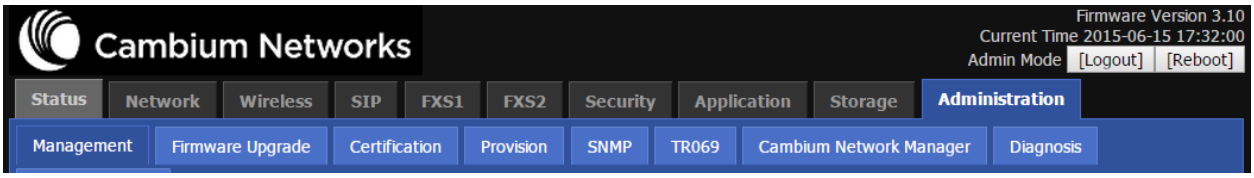


Table 78: Logout

Description
Press the logout button to logout, and then the login window will appear.

Reboot

Press the Reboot button to reboot cnPilot Home Routers.

Chapter 4: Troubleshooting

This chapter contains the following topics:

- Configuring PC to get IP Address automatically
- Cannot connect to the Web GUI
- Forgotten Password
- cnMaestro On-boarding troubleshooting

Configuring PC to get IP Address automatically

Refer the Quick Start Guide to configure your PC to get IP Address automatically.

Cannot connect to the Web GUI

If Web GUI is not getting connected, then perform the following steps:

1. Check if the Ethernet cable is properly connected.
2. Connect to LAN port and access https://192.168.11.1 or http://192.168.11.1. Check on any other browser other than Internet Explorer, such as Firefox or Mozilla.
3. Contact your administrator, supplier or ISP for more information or assistance.

Forgotten Password

The default password is admin/admin user/user. If it is changed to non-default, then factory reset may be required.

> **Note**
>
> On factory reset, all the device configurations are reset to the default.

Solution:

To factory default reset, press and hold reset button for 10 seconds.

If device is onboarded in cnMaestro then password can be set through **config push**.

cnMaestro On-boarding troubleshooting

The On-boarding troubleshooting procedure is described below:

1. During the Cambium ID on boarding, if the device dashboard or home page displays the cnMaestro connection status as the following:

Error Status	Cause	Resolution
Failed to Resolve URL	The cloud URL is not being resolved by the device.	Ensure that the correct cnMaestro URL is configured. If the URL is correct, check the DNS settings and Internet connectivity. If the Internet connectivity and DNS works fine then check the firewall configuration for device IP Address and the protocols http/https/SSL are allowed as part of ACL.
Invalid Cambium ID/Password	Wrong configuration of cambium ID or On Boarding key	Ensure that the correct credentials are entered.
Invalid Cookie or Cambium ID not configured	Device is unclaimed	Claim the device either by serial number or Cambium ID
Device Not Claimed	Device is not claimed	Claim the device either by serial number or Cambium ID
Connecting	Device is trying to connect to the cnMaestro server	Device is in connecting state

2. During the serial number on boarding, following are the error messages:

Error Status	Cause	Resolution
Unknown Device	Device serial number is not known to cnMaestro server	Send a mail to solutions@cambiumnetworks.com for the serial numbers to be added to the server database.
Invalid Serial Number	Device serial number is less than 12 characters and given for claiming	Enter the correct serial number of the device or try on boarding using Cambium ID.
Already Managed by this account	Device is already managed by the current user account	Do not try both the serial number and cambium ID on boarding methods at the same time.
Already Managed by other Account	Device is already claimed in another user account	Ensure that the entered serial number of device belongs to current user account.

After the error messages occurs, click **OK** on the error dialog and then verify the serial numbers by entering correct values and initiate the claiming procedure.

Else, you can clear the wrong serial numbers if it need not to be claimed. This allows you not to re-enter serial number again and remove the invalid characters from entered serial number.

3. cnMaestro Account ID is the Cambium ID or Account Name chosen while creating the company account which indicates that the device belongs to that account. cnMaestro Account ID is blank

when the device is not claimed and populated when the device is claimed in the cnMaestro server. The Account ID is available in the device dashboard or home page.

Appendix: Third Party Software

The software may contain one or more items of Third-Party Software supplied by other third-party suppliers. The terms of this Agreement govern your use of any Third-Party Software license is included, in which case your use of the unless a separate third-party software license is included, in which case your use of the third-party software will then be governed by the separate third-party license.

Zap	Copyright (c) 2004-2009, Ruckus Wireless, Inc. All rights reserved. Redistribution and use in source and binary forms, with or without modification are permitted provided that the following conditions are met: * Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer. * Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution. * Neither the name of Ruckus Wireless nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission. THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT, SHALL COPYRIGHT HOLDER OR CONTRIBUTERS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Appendix: Part Numbers

Manufacturer: Cambium Networks Inc.

Address: 3800 Golf Road #360, Rolling Meadows, IL 60008 USA.

Importers:

Address:

Adapter Caution: Adapter shall be installed near the equipment and shall be easily accessible.

The following tables provides accessories details for cnPilot Home Routers:

Appendix: Part Numbers

The software may contain one or more items of Third-Party Software supplied by other third-party suppliers. The terms of this Agreement govern your use of any Third-Party Software license is included, in which case your use of the unless a separate third-party software license is included, in which case your use of the third-party software will then be governed by the separate third-party license.

Part Numbers for cnPilot r195P Home Router

Part Number	Description	AC Power Cord Part Number
PL-r195PUSA-US	Home and Small Business Wi-Fi Router and Voice Gateway, 802.11AC with Cambium power out, US	N000900L040A
PL-r195PEUA-EU	Home and Small Business Wi-Fi Router and Voice Gateway, 802.11AC with Cambium power out, EU	N000900L041A
PL-r195PEUA-RW	Home and Small Business Wi-Fi Router and Voice Gateway, 802.11AC with Cambium power out, RW	N000900L041A
PL-r195PNPA-RW	Home and Small Business Wi-Fi Router and Voice Gateway, 802.11AC with Cambium power out, RW	-
PL-r195PUKA-EU	Home and Small Business Wi-Fi Router and Voice Gateway, 802.11AC with Cambium power out, EU	N000900L045A
PL-r195PINA-RW	Home and Small Business Wi-Fi Router and Voice Gateway, 802.11AC with Cambium power out, RW	N000900L043A
PL-r195PANA-RW	Home and Small Business Wi-Fi Router and Voice Gateway, 802.11AC with Cambium power out, RW	N000900L042A
PL-r195PNTA-RW	Home and Small Business Wi-Fi Router and Voice Gateway, 802.11AC with Cambium power out, RW	N000900L044A
PL-r195PARA-RW	Home and Small Business Wi-Fi Router and Voice Gateway, 802.11AC with Cambium power out, RW	N000900L047A

Part Numbers for cnPilot r195W Home Router

Part Number	Description	12V 1A Wall Adaptor
PL-R195WUSA-US	r195W US type A P/S, 802.11n/AC Dual Band 2x2 WLAN access point	XA-PS12V1XA-US
PL-R195WEUA-EU	r195W EU type C P/S, 802.11n/AC Dual Band 2x2 WLAN access point	XA-PS12V1XA-EU
PL-R195WNPA-RW	r195W No line cord, 802.11n/AC Dual Band 2x2 WLAN access point	_
PL-R195WUKA-EU	r195W UK type G P/S, 802.11n/AC Dual Band 2x2 WLAN access point	XA-PS12V1XA-UK

Part Number	Description	12V 1A Wall Adaptor
PL-R195WINA-RW	r195W India type D P/S, 802.11n/AC Dual Band 2x2 WLAN access point	XA-PS12V1XA-IN
PL-R195WANA-RW	r195W AUS/NZ type I P/S, 802.11n/AC Dual Band 2x2 WLAN access point	XA-PS12V1XA-AN
PL-R195WNTA-RW	r195W Brazil type N P/S, 802.11n/AC Dual Band 2x2 WLAN access point	XA-PS12V1XA-NT
PL-R195WARA-RW	r195W Argentina type I P/S 802.11n/AC Dual Band 2x2 WLAN access point	TBD

Part Numbers for cnPilot r200, r200P Home Routers

Part Number	Description	12V 2A Wall Mount or 12V 3A Desktop Adaptor
C000000L024A	cnPilot r200 US, 802.11n single band 300Mbps WLAN Router with ATA	XA-PS2AWPGA-US
C000000L025A	cnPilot r200 EU, 802.11n single band 300Mbps WLAN Router with ATA	XA-PS2AWPGA-EU
C000000L037A	cnPilot r200 AUS, 802.11n single band 300Mbps WLAN Router with ATA	XA-PS3ADTA-WW
C000000L038A	cnPilot r200 India, 802.11n single band 300Mbps WLAN Router with ATA	XA-PS3ADTA-WW
C000000L039A	cnPilot r200 Brazil, 802.11n single band 300Mbps WLAN Router with ATA	XA-PS3ADTA-WW
PL-R200XUKA-WW	cnPilot r200 (UK cord) 802.11n single band WLAN Router with ATA	XA-PS3ADTA-WW
PL-R200XCNA-WW	cnPilot r200 (China cord) 802.11n single band WLAN Router with ATA	XA-PS3ADTA-WW
PL-R200XARA-WW	cnPilot r200 (Argentina cord) 802.11n single band WLAN Router with ATA	XA-PS3ADTA-WW

Part Numbers for cnPilot R201, R201P Home Routers

Part Number	Description	12V 2A wall mount or 12V 3A Desktop Adaptor
C000000L029A	cnPilot r201 EU, 802.11ac dual band Gigabit WLAN Router with ATA	XA-PS2AWPGA-US
C000000L040A	cnPilot r201 AUS, 802.11ac dual band Gigabit WLAN Router with ATA	XA-PS2AWPGA-EU

Part Number	Description	12V 2A wall mount or 12V 3A Desktop Adaptor
C000000L041A	cnPilot r201 India, 802.11ac dual band Gigabit WLAN Router with ATA	XA-PS3ADTA-WW
C000000L042A	cnPilot r201 Brazil, 802.11ac dual band Gigabit WLAN Router with ATA	XA-PS3ADTA-WW
PL-R201XUKA-WW	cnPilot r201 (UK cord) 802.11ac dual band WLAN Router with ATA	XA-PS3ADTA-WW
PL-R201XCNA-WW	cnPilot r201 (China cord) 802.11ac Dual band WLAN Router with ATA	XA-PS3ADTA-WW
PL-R201XARA-WW	cnPilot r201 (Argentina cord) 802.11ac Dual band WLAN Router with ATA	XA-PS3ADTA-WW

Part Numbers for r201W Home Router

Part Number	Description	12V 3A
C000000L032A	cnPilot r201W, India, 802.11ac dual band Gigabit WLAN Router with PoE	XA-PS3ADTA-WW

Part Numbers for cnPilot r190W Home Router

Part Number	Description	5V/1A Wall Mount
PL-r190WUSA-WW	r190W US Cord, 802.11n 2.4 GHz WLAN router	XA-PS5V1XXA-US
PL-r190WEUA-WW	r190W EU Cord, 802.11n 2.4 GHz WLAN router	XA-PS5V1XXA-EU
PL-r190WUKA-WW	r190W UK Cord, 802.11n 2.4 GHz WLAN router	XA-PS5V1XXA-UK
PL-r190WINA-WW	r190W India Cord, 802.11n 2.4 GHz WLAN router	XA-PS5V1XXA-IN

Part Numbers for cnPilot r190V Home Router

Part Number	Description	12V/ 1A Wall Mount
PL-r190VUSA-WW	r190V US Cord, 802.11n 2.4 GHZ WLAN router with built-in ATA HW	XA- PS12V1XA - US
PL-r190VEUA-WW	r190V EU Cord, 802.11n 2.4 GHZ WLAN router with built-in ATA HW	XA- PS12V1XA - EU
PL-r190VUKA-WW	r190V UK Cord, 802.11n 2.4 GHZ WLAN router with built-in ATA HW	XA- PS12V1XA - UK
PL-r190VINA-WW	r190V India Cord, 802.11n WLAN router with built-in ATA HW	XA- PS12V1XA - IN

Part Number	Description	12V/ 1A Wall Mount
PL-r190VANA-AN	r190V AUS/NZ Cord, 802.11n 2.4 GHZ WLAN router with built-in ATA HW	XA- PS12V1XA -AN

Hereby, Cambium Networks Inc. agrees that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. A copy of the declaration of conformity can be obtained with this user manual.

This product is not restricted in the EU.

Operation Temperature Range: -5°C ~ +45°C

Frequency Range:

2.4 GHz: 2412MHz-2472MHz

5 GHz: 5180-5825 MHz

Max power: 20dBm

This equipment should be installed and operated with minimum distance 20 cm between the radiator.

Glossary

Term	Definition
ATA	Advanced Technology Attachment
Address Resolution Protocol	Protocol defined in RFC 826 to allow a network element to correlate a host IP address to the Ethernet address of the host. See http://www.faqs.org/rfcs/rfc826.html.
Bridge	Network element that uses the physical address (not the logical address) of another to pass data. The bridge passes the data to either the destination address, if found in the simple routing table, or to all network segments other than the one that transmitted the data. Modules are Layer 2 bridges except that, where NAT is enabled for an SM, the SM is a Layer 3 switch. Compare to Switch and Router, and see also NAT.
DES	Data Encryption Standard. An over-the-air link option that uses secret 56-bit keys and 8 parity bits. DES performs a series of bit permutations, substitutions, and recombination operations on blocks of data.
DHCP	Dynamic Host Configuration Protocol defined in RFC 2131. Protocol that enables a device to be assigned a new IP address and TCP/IP parameters, including a default gateway, whenever the device reboots. Thus DHCP reduces configuration time, conserves IP addresses, and allows modules to be moved to a different network within the system. See http://www.faqs.org/rfcs/rfc2131.html. See also Static IP Address Assignment.
DNS	Domain Name System, a system for naming computers and network services that is organized into a hierarchy of domains

Term	Definition
File Transfer Protocol	Utility that transfers of files through TCP (Transport Control Protocol) between computing devices that do not operate on the same platform. Defined in RFC 959. See http://www.faqs.org/rfcs/rfc959.html.
FTP	File Transfer Protocol defined in RFC 959. Utility that transfers of files through TCP (Transport Control Protocol) between computing devices that do not operate on the same platform. See http://www.faqs.org/rfcs/rfc959.html.
FXS	Foreign Exchange Station means the wall jack or the interface to the telephone system which FXO devices can be connected to
Gateway	A network point that acts as an entrance to another network.
GUI	Graphical user interface.
HTTP	Hypertext Transfer Protocol used to make the Internet resources available on the World Wide Web. Defined in RFC 2068. See http://www.faqs.org/rfcs/rfc2068.html.
HTTPS	Hypertext Transfer Protocol Secure (HTTPS)
ICMP	Internet Control Message Protocols defined in RFC 792, used to identify Internet Protocol (IP)-level problems and to allow IP links to be tested. See http://www.faqs.org/rfcs/rfc792.html.
IGPM	The Internet Group Management Protocol (IGMP) is a communications protocol used by hosts and adjacent routers on IPv4/IPv6 networks to establish multicast group memberships.
IP	Internet Protocol defined in RFC 791. The Network Layer in the TCP/IP protocol stack. This protocol is applied to addressing, routing, and delivering, and re-assembling data packets into the Data Link layer of the protocol stack. See http://www.faqs.org/rfcs/rfc791.html.
IP Address	32-bit binary number that identifies a network element by both network and host. See also Subnet Mask.
IPv4	Traditional version of Internet Protocol, which defines 32-bit fields for data transmission.
ISM	Industrial, Scientific, and Medical Equipment radio frequency band, in the 900-MHz, 2.4-GHz, and 5.8-GHz ranges.
L2TP over IPSec	Level 2 Tunneling Protocol over IP Security. One of several virtual private network (VPN) implementation schemes. Regardless of whether Subscriber Modules have the Network Address Translation feature (NAT) enabled, they support VPNs that are based on this protocol.
LED	Light-Emitting Diode
MAC Address	Media Access Control address. The hardware address that the factory assigns to the module for identification in the Data Link layer interface of the Open Systems Interconnection system. This address serves as an electronic serial number.
NAT	Network Address Translation defined in RFC 1631. A scheme that isolates Subscriber Modules from the Internet. See http://www.faqs.org/rfcs/rfc1631.html.

Term	Definition
NEC	National Electrical Code. The set of national wiring standards that are enforced in the U.S.A.
NetBIOS	Protocol defined in RFC 1001 and RFC 1002 to support an applications programming interface in TCP/IP. This interface allows a computer to transmit and receive data with another host computer on the network. RFC 1001 defines the concepts and methods. RFC 1002 defines the detailed specifications. See http://www.faqs.org/rfcs/rfc1001.html andhttp://www.faqs.org/rfcs/rfc1002.html.
Network Address Translation	Scheme that defines the Access Point Module as a proxy server to isolate registered Subscriber Modules from the Internet. Defined in RFC 1631. See http://www.faqs.org/rfcs/rfc1631.html.
Network Management Station	See NMS.
NMS	Network Management Station. A monitor device that uses Simple Network Management Protocol (SNMP) to control, gather, and report information about predefined network variables (objects). See also Simple Network Management Protocol.
NTP	Network Time Protocol (NTP) is a protocol that is used to synchronize computer clock times in a network of computers
PPPoE	Point to Point Protocol over Ethernet. Supported on SMs for operators who use PPPoE in other parts of their network operators who want to deploy PPPoE to realize per-subscriber authentication, metrics, and usage control.
QoS	Quality of Service (QoS) refers to the capability of a network to provide better service to selected network traffic over various technologies
RJ-45	Standard cable that is typically used for Ethernet connection. This cable may be wired as straight-through or as crossover. Later modules auto-sense whether the cable is straight-through or crossover.
Router	Network element that uses the logical (IP) address of another to pass data to only the intended recipient. Compare to Switch and Bridge.
SIP	Session Initiation Protocol
Simple Network Management Protocol	Standard that is used for communications between a program (agent) in the network and a network management station (monitor). Defined in RFC 1157. See http://www.faqs.org/rfcs/rfc1157.html.
SNMP	See Simple Network Management Protocol, defined in RFC 1157.
SNMPv3	SNMP version 3
Static IP Address Assignment	Assignment of Internet Protocol address that can be changed only manually. Thus static IP address assignment requires more configuration time and consumes more of the available IP addresses than DHCP address assignment does. RFC 2050 provides guidelines for the static allocation of IP addresses. See http://www.faqs.org/rfcs/rfc2050.html. See also DHCP.

Term	Definition
SSID	Service Set Identifier
Subnet Mask	32-bit binary number that filters an IP address to reveal what part identifies the network and what part identifies the host. The number of subnet mask bits that are set to 1 indicates how many leading bits of the IP address identify the network. The number of subnet mask bits that are set 0 indicate how many trailing bits of the IP address identify the host.
Switch	Network element that uses the port that is associated with the physical address of another to pass data to only the intended recipient. Compare to Bridge and Router.
TCP	Alternatively known as Transmission Control Protocol or Transport Control Protocol. The Transport Layer in the TCP/IP protocol stack. This protocol is applied to assure that data packets arrive at the target network element and to control the flow of data through the Internet. Defined in RFC 793. See http://www.faqs.org/rfcs/rfc793.html.
TFTP	Trivial File Transfer Protocol is a simple high-level protocol for transferring data servers.
TKIP	Temporal Key Integrity Protocol
TR 069	TR-069 (Technical Report 069) is a technical specification that defines an application layer protocol for remote management of end-user devices.
VLAN	Virtual local area network. An association of devices through software that contains broadcast traffic, as routers would, but in the switch-level protocol.
UPnP	Universal Plug and Play
USB	Universal Serial Bus
WDS	Wireless Distribution System
WLAN	Wireless Local Area Network
WMM	Wi-Fi Multimedia
WPA2-PSK	Wi-Fi Protected Access 2 - Pre-Shared Key, and also called WPA or WPA2 Personal, it is a method of securing your network using WPA2 with the use of the optional Pre-Shared Key (PSK) authentication, which was designed for home users without an enterprise authentication server.
WPS	Wi-Fi Protected Setup

Cambium Networks

Cambium Networks delivers wireless communications that work for businesses, communities, and cities worldwide. Millions of our radios are deployed to connect people, places and things with a unified wireless fabric that spans multiple standards and frequencies of fixed wireless and Wi-Fi, all managed centrally via the cloud. Our multi-gigabit wireless fabric offers a compelling value proposition over traditional fiber and alternative wireless solutions. We work with our Cambium certified ConnectedPartners to deliver purpose-built networks for service provider, enterprise, industrial, and government connectivity solutions in urban, suburban, and rural environments, with wireless that just works.

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