Loopcomm

Outdoor Long Range 802.11a/n 5GHz Wireless AP/CPE/Bridge (2T2R)

User Manual

Model: LP-2596K

Version: 1.0

Table of Contents

Notice

- This document is issued to guide users how to install and operate LP-2596K Outdoor Long Range 802.11a/n Wireless AP/CPE/Bridge. Please read the document carefully to avoid any damage which is caused by inappropriate use excluding from the warranty.

- Loopcomm Technology Inc. reserves the right to revise/update the content of LP-2596K user manual without advance notice.

Chapter 1 Product Introduction

Loopcomm LP-2596K is an Outdoor Long Range 5GHz Wireless AP/CPE/Bridge that provides wide coverage of network connection in existing environment. It can operate up to 300Mbps data rate by supporting IEEE 802.11a/n standard and with full WEP, WPA/WPA2 data security, Wireless LAN Access Control List and TKIP/AES encryption, It keeps the data transmission safe in any network connection mode. Moreover, it supports different operation modes for any user's applications like point to point network and IP surveillance.

Product Outline

Product Feature

- Wireless Standards : IEEE 802.11a/n
- Data transmission rate up to 300 Mbps at 40 MHz bandwidth
- Operation Mode: Bridge/Wireless ISP
- Wireless Mode: AP/Station/WDS AP/WDS Station
- Reliable data security including WEP, WPA/WPA2, WPA-PSK/RADIUS, and WPA2-PSK/RADIUS with TKIP/AES encryption.
- DFS (Dynamic Frequency Selection) Channel supported (for EU version)
- Support SNMP V2 management, SSH, NTP, and Telnet.
- Support QoS bandwidth control
- MAC Access Control
- Built-in Web-based management and firmware upgrade
- PoE pass through available on Secondary Ethernet port (Configurable via Web UI)
- Remotely enable system reset by PoE Injector

Application

Wireless ISP (WISP) Mode:

LP-2596K can operate as station (client) in WISP mode to remotely receive broadband signal from WISP outdoor AP (base station) of Internet Service Provider (ISP).

Bridge Mode:

Since the antenna characteristics for LP-2596K is directional with high gain design, it can transmit RF signal for several miles. Based on this point, LP-2596K is greatly used to bridge at long distance transmission for point to point applications like IP surveillance, networking company.
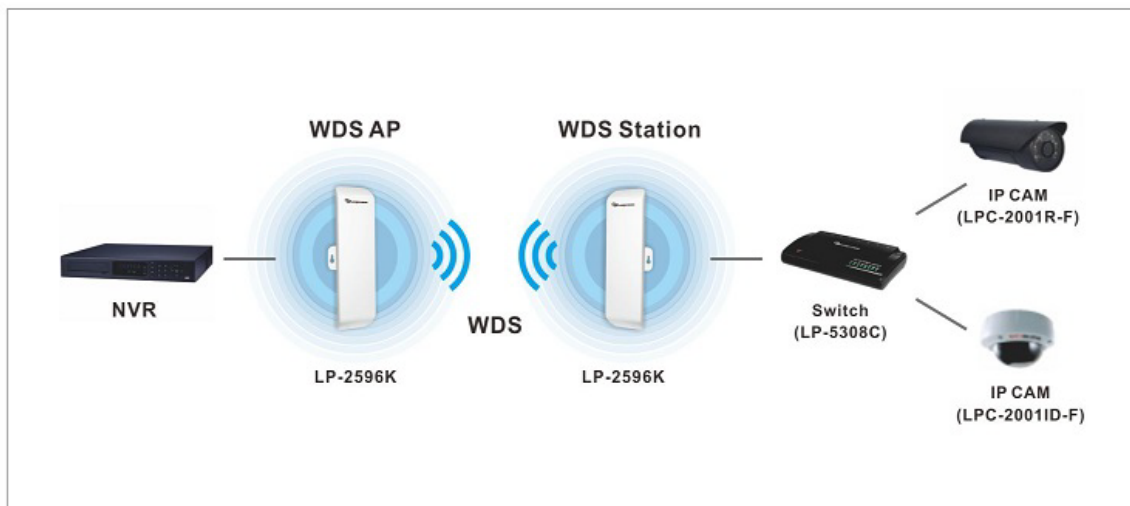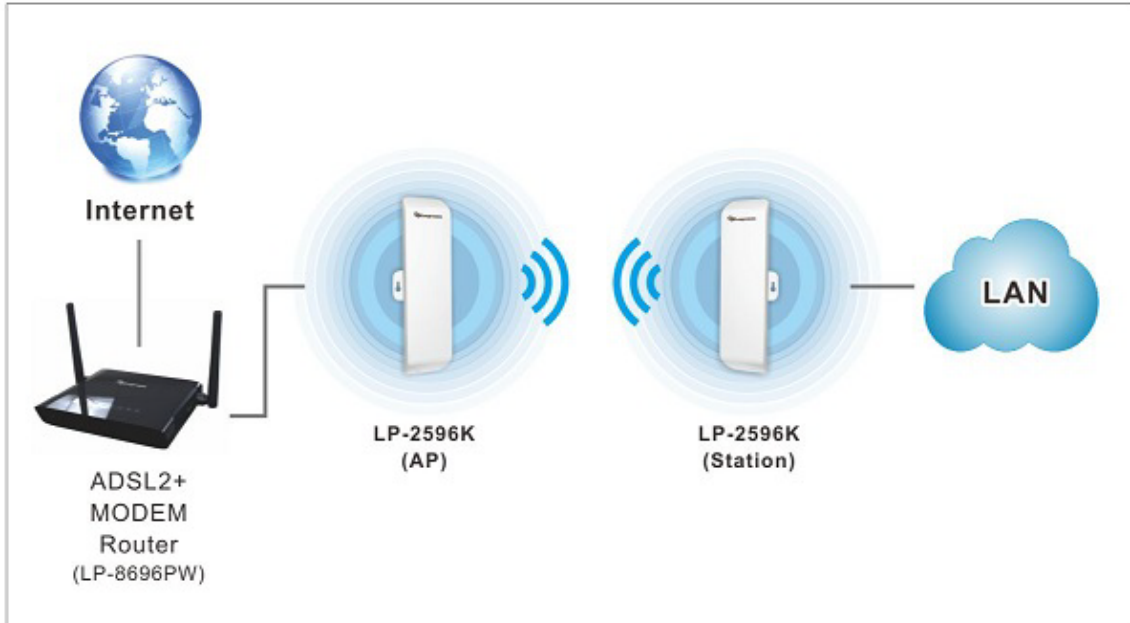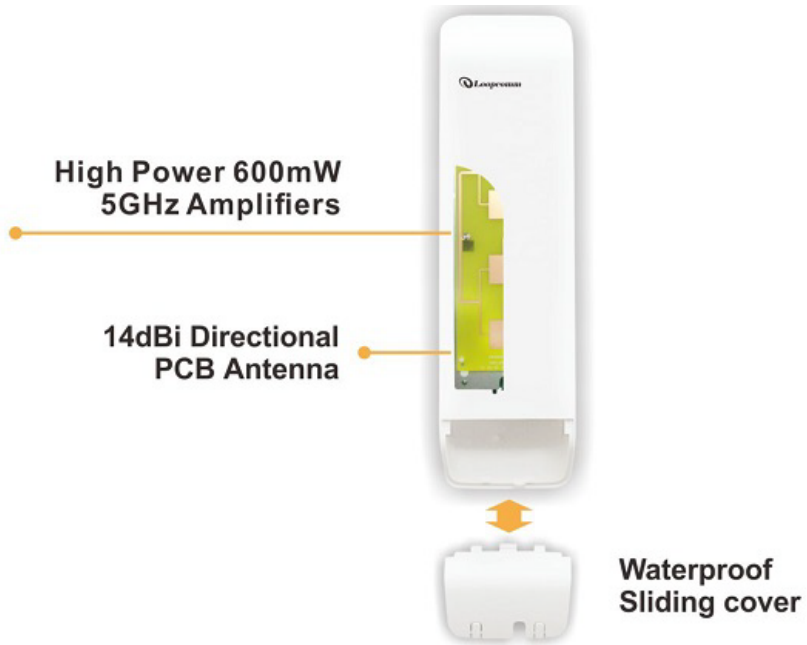
Product Specification

General

Item	Description
SOC	Atheros AR9344
Physical Interface	One 10/100Mbps Fast Ethernet port (Main)
	One 10/100Mbps Fast Ethernet port (Secondary)
	Reset button
	Earth Ground
LED Indicator	Power, Secondary, Main, Signal Strength
Antenna	14dBi PCB directional antenna
Power Requirement	24V/1A Passive PoE (DC+: pin 4, 5; DC-: pin 7,8)
Power Consumption	12W (maximum)
Operating Temperature	-20° ~ 70° C
Storage Temperature	-30° ~ 80° C
Humidity	0 ~ 90%
ESD Protection	Contact 4KV, Air 8KV
Lightning Protection	1KV
Certification	FCC, CE

IEEE 802.11a/n Specification
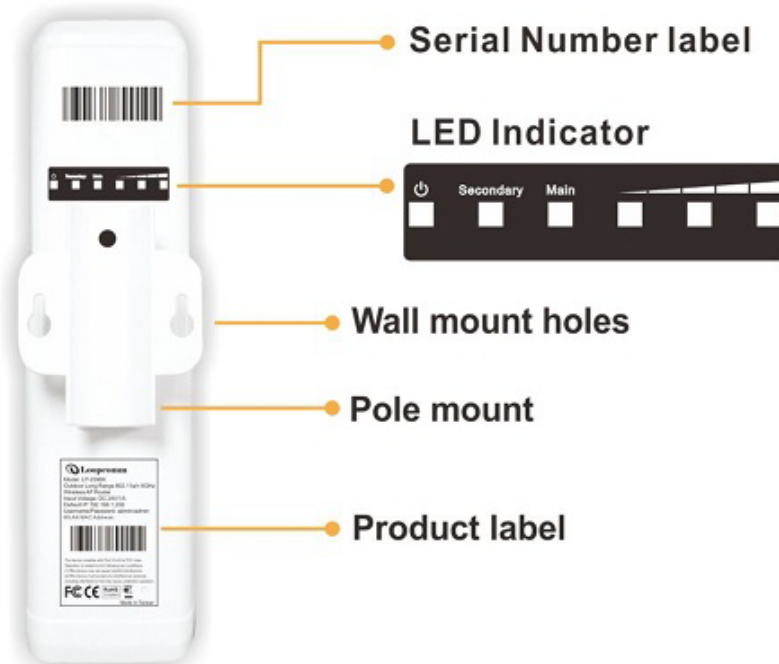
Item	Description
Wireless Standard	IEEE 802.11a/n
Frequency	5.18 ~ 5.825GHz
Channel	CH 36 ~ 165 (5.18 ~ 5.825GHz) for US version
	CH 100 ~ 140 (5.5 ~ 5.68GHz) for EU version
Date Rate	802.11a: 54Mbps
	802.11n (BW 20MHz): 144Mbps
	802.11n (BW 40MHz): 300Mbps
Modulation	802.11a: BPSK, QPSK, 16QAM, 64QAM
	802.11n: OFDM
Media Access Control	CSMA/CA with ACK
Transmit Power	802.11a: 25 +/-1 dBm
	802.11n: 24 +/-1 dBm
Receive Sensitivity	-94dBm@802.11a
	-93dBm@802.11n

Outline Introduction

Front view

High Power 600mW
5GHz Amplifiers

14dBi Directional
PCB Antenna

Waterproof
Sliding cover

Back view

Serial Number label

LED Indicator

⏻ Secondary Main

Wall mount holes

Pole mount

Product label

LED Indication

LED Indicator	Status	Description
⏻	ON	The LP-2596K is powered ON.
	OFF	The LP-2596K is powered OFF.
Secondary	ON	Port linked.
	OFF	No connection.
	Blink	Data is being transmitted or received on the Secondary Ethernet port.
Main	ON	Port linked.
	OFF	No connection.
	Blink	Data is being transmitted or received on the Main Ethernet port.
Signal Strength	AP/Station mode	It stands for the TX power strength as AP mode or connection quality as Station mode.

I/O Interface
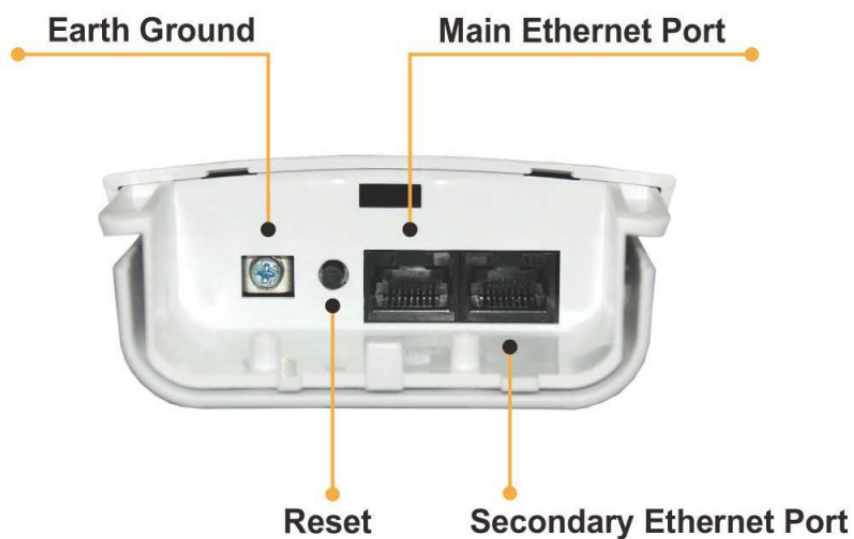
Item	Description
Main	It mainly used as Power over Ethernet (PoE) port, which allows the router powered up by PoE adapter when the connection is established by RJ-45 Cat.5 cable. It supports auto-sensing on 10/100M speed, half/ full duplex, and complies with IEEE 802.3/ 802.3u respectively.
Secondary	The Secondary Ethernet port allows users to connect to another device through RJ-45 Cat.5 cable. It supports auto-sensing on 10/100M speed, half/ full duplex, and complies with IEEE 802.3/ 802.3u respectively.
Reset Bottom	Press continually the reset button at least 5 seconds to reset the configuration parameters to factory defaults
Earth Ground	It used to connect the metal line to ground in order to avoid the device from external electrical damage.

Note. LP-2596K built in PoE pass through function on Secondary Ethernet port. It means the Secondary Ethernet port is able to provide 24V power for a secondary device if this function enabled on Web Configuration (Please refer to the statement on Advanced Setting of Radio menu).

Product Label

It includes related essential information about LP-2596K stickered on the back of device.

39mm

59mm

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Model: LP-2596K
Outdoor Long Range 802.11a/n 5GHz
Wireless AP/CPE/Bridge
Input Voltage: DC 24V/1A
Default IP Address:192.168.1.200
Username/Password: admin/admin
WLAN MAC Address:

MAC:001AEF426FBD
FCC ID:VYTLP2596K
The device complies with Part 15 of the FCC rules.
Operation is subject to the following two conditions:
(1) This device may not cause harmful interference.
(2) This device must accept any interference received,
including interference that may cause undesired operation.

FC CE RoHS Compliant
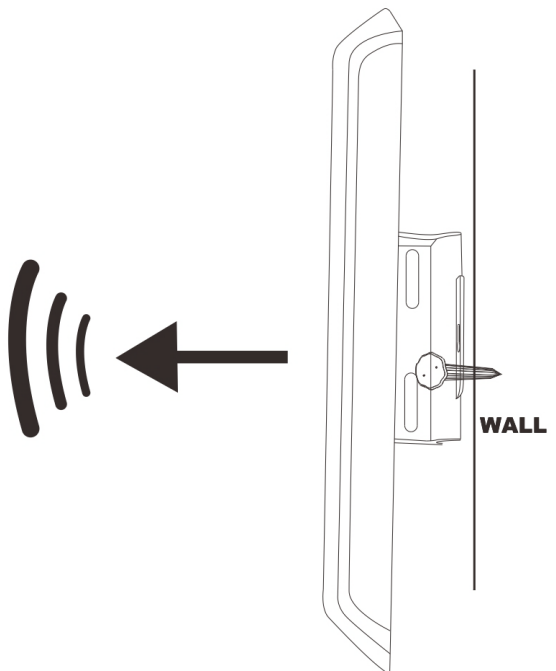Made in Taiwan

Mounting Options

Pole Mount

Use cable tie and make it pass through the one of middle holes to fix and tie on the pole.
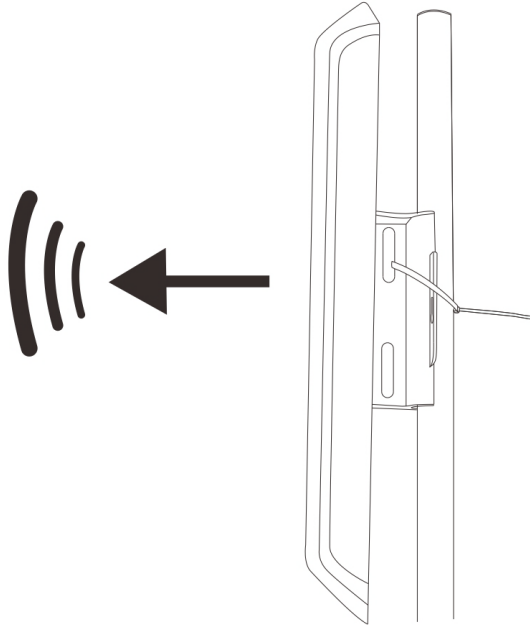
Wall Mount

Please fix the screws into the wall and hang LP-2596K on the corresponding screws.

Package Content

The package content includes the following items, shown from left to right as figure.

- LP-2596K
- DC 24V/1A Power adapter
- PoE Injector
- Product CD
- Cable Tie
- Quick Installation Guide (QIG)

LP-2596K

24V Power Adapter

PoE Injector

CD

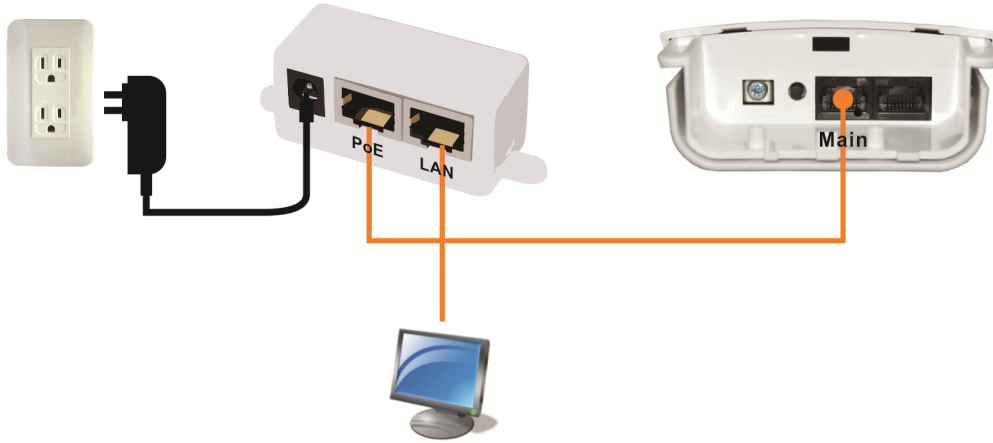Cable Tie

Quick Installation Guide

Chapter 2 Hardware Installation

Connection Diagram

Installation Steps

1. Take off the water-proof sliding cover.
2. Connect the **Main** Ethernet port of LP-2596K with a RJ-45 cable.

Note. LP-2596K built in PoE pass through function on Secondary Ethernet port. It means the Secondary Ethernet port is able to provide 24V power for a secondary device if this function enabled on Web Configuration (Please refer to the statement on Advanced Setting of Radio menu).

3. Make the water-proof sliding cover well installed.

4. Connect PoE Injector to LP-2596K shown on diagram.
   - DC: Plug in the DC jack of 24V/1A power adapter
   - PoE port: Connect to Main Ethernet port with a RJ-45 cable.
   - LAN port: Connect to your computer/laptop for Web configuration.
   - Reset button: It allows user to remotely reset the system of LP-2596K.

Note.

1. There is no software driver or utility installation needed.

2. RJ-45 8P8C Ethernet cable is required.

3. It takes about 60 seconds to complete the boot up sequence after LP-2596K powered up.

Example – Scenario for IP surveillance

The following figure indicates the basic setup to implement IP surveillance with a pair of LP-2596K. The remote monitoring image can be delivered to local NVR via the high powered, long distance transmission by LP-2596K.

Chapter 3 Software Configuration

System Requirements:

- Microsoft Windows XP/Vista/7/8, Mac iOS, Linux
- A Web Browser supports HTTP such as Internet Explorer, Google Chrome, Safari, and Mozilla Firefox etc.

Network Connection Setup:

The default IP of LP-2596K is *192.168.1.200*. You have to make sure your computer is on the same network segment as LP-2596K before connecting to LP-2596K.

Example: In the Windows 7 operating system

1. Press Start and enter **ncpa.cpl** in search bar. You will see network connection page.
2. Select your network interface card and Right click to set Properties.
3. Double click *Internet Protocol Version 4 (TCP/IPv4)*.
4. Select *Specify an IP address* and enter the IP address.
   IP Address: *192.168.1.x (x can be any number between 1 to 254 except for 200)*
   Subnet Mask: *255.255.255.0*
   Default Gateway: *192.168.1.200*
5. Click OK to complete the IP setting.
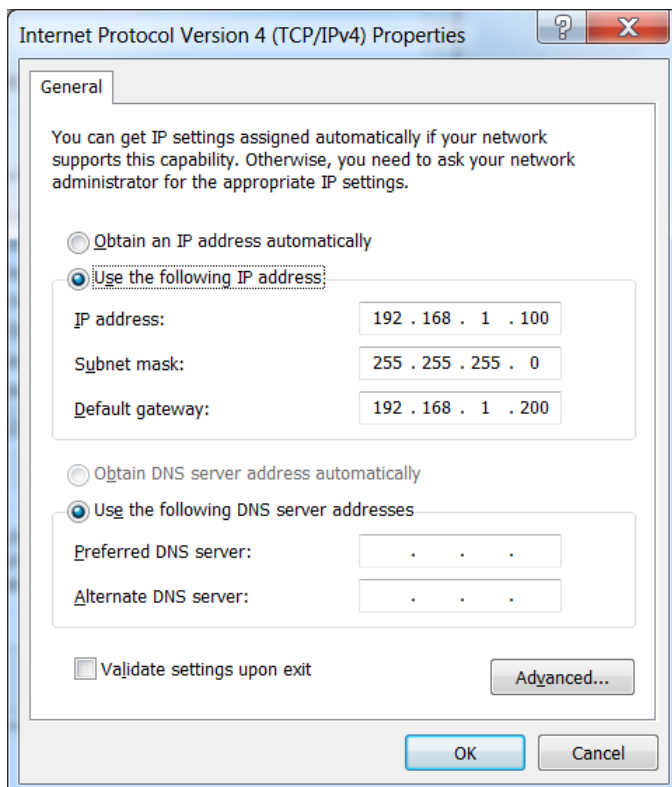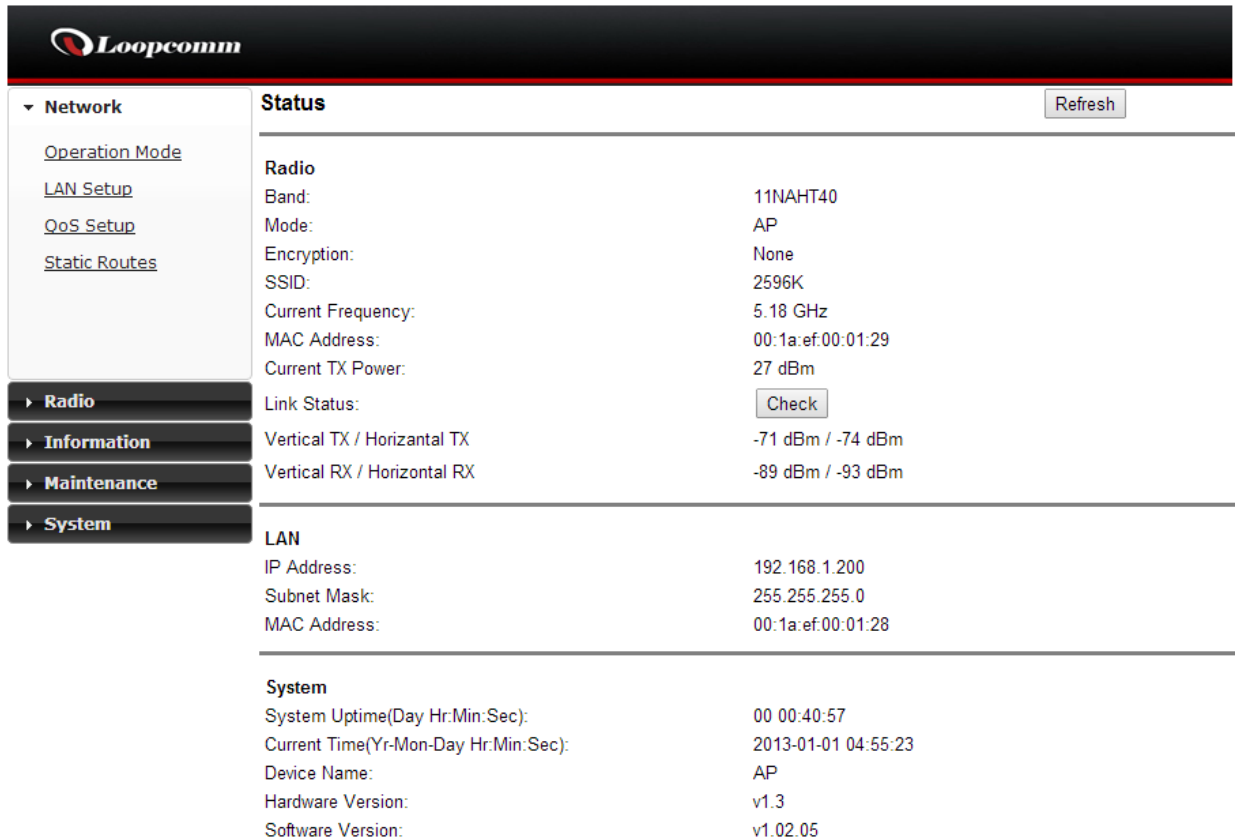
Get started with LP-2596K

1. Open Web browser and enter *192.168.1.200* in the URL field of Web browser.

2. Enter "**admin**" as default user name, and "**admin**" as default password.

After successful login , you'll see the system status shown as below.

Web configuration of LP-2596K

Network

There're four sub-menus in Network menu including Operation Mode, LAN Setup, QoS Setup and Static Routes.

Operation Mode

Select network mode on the drop down menu and click Apply button to take it effect.

Bridge - All Ethernet ports (Main/Secondary) and wireless interface are bridged in the same network segment, so DHCP server is disabled.

Operation Mode

Network Mode: [Bridge ▼]

In this mode, all ethernet ports and wireless interface are bridged together and NAT function is disabled. All the WAN related function and firewall are not supported.

[Apply]

Wireless ISP – When LP-2596K is switched to Wireless ISP mode, please also set wireless mode LP-2596K as station that means LP-2596K remotely receive broadband signal from WISP outdoor AP (base station) of Internet Service Provider (ISP). Main and Secondary Ethernet ports are bridged in the same network segment and DHCP server will be enabled.

Operation Mode

Network Mode: [Wireless ISP ▼]

In this mode, all ethernet ports are bridged together and the wireless client will connect to ISP access point. The NAT is enabled and PCs in ethernet ports share the same IP to ISP through wireless LAN. You must set the wireless to client mode first and connect to the ISP AP in SiteSurvey page.

[Apply]

LAN Setup

You can configure LAN (secondary)including IP and DHCP on this page.

Note.

1. **When spanning tree protocol (STP) enabled, it will eliminate bridging loops across the LAN interfaces.**
2. **DHCP server is disabled in condition of the bridge operation mode, otherwise it's enabled as default when LP-2596K operates in Wireless ISP mode.**

QoS Setup

Quality of service (QoS) is especially used for network traffic/bandwidth control with specific requirements such as Video Streaming in IP surveillance application.

QoS Setup

Quality of Service:	Disable ▼

QoS Rules Settings

Local IP Address:	[ ] - [ ]
Uplink Bandwidth (Kbps):	[ ] ⬍
Downlink Bandwidth (Kbps):	[ ] ⬍
Comment:	[ ]

Save

Current QoS Table

IP Address Start	IP Address End	Uplink(Kbps)	Downlink(Kbps)	Comment	Select

Delete   Delete All   Apply

Static Routes

Static routing is a network routing method that builds up the connection by manually-configured routing entry. In most cases, static routes are usually manually configured by a network administrator by adding in entries into a routing table.

Static Routes

ID	Enable	IP Address	Netmask	Gateway IP	Comment
1	No ▼				
2	No ▼				
3	No ▼				
4	No ▼				
5	No ▼				
6	No ▼				

Apply

Note. It will be enabled when operation mode is switched to Wireless ISP.

Radio

There're four sub-menus in Radio menu including Basic Settings, Advanced Settings, Security and MAC Address Control.

Basic Setting

This page contains essential wireless network settings as follows:

Basic Settings

Band:	5G 11NA HT40 ▼
Channel:	36 -5180MHz ▼
Data Rate:	Auto ▼
Mode:	Access Point ▼ SiteSurvey
SSID:	LP-2596K
Suppress SSID:	Disable ▼
Country code:	USA ▼
Change MAC Address:	Disable ▼
MAC Address:	00:00:00:00:00:00
Transmission Distance:	■———— 1 km

Apply

Band	Click to select wireless band from pull down menu.
Channel	Select the wireless communication frequency/channel from pull-down menu.
Data Rate	Defines the data rate (in Mbps) at which the device should transmit wireless packets. You can fix a specific data rate between MCS 0 and MCS 7 (or MCS 15 for 2x2 chain devices).
Mode	Click to select wireless mode (AP/ Station/ WDS+AP/ WDS+Station) from drop-down menu.
SSID	It is the wireless network name. The SSID can be 32 bytes long. User can use the default SSID or change it.
Suppress SSID	Enable or disable the SSID broadcast function.
Country Code	Choose your own country.
Change MAC Address	When the router operates as station mode, sometimes you will see the multiple SSID of many AP will be likely the same. In this condition, you can connect the required SSID and then enter its MAC address to keep the connection constant, even if reconnect it next time.

Transmission Distance	Changing the distance value will change the ACK (Acknowledgement) timeout value accordingly, so it means the distance should be set as real distance between LP-2596K and other device for accurate transmission performance.

Note. WDS (wireless distribution system) is a wireless interconnection system of access points in an IEEE 802.11 network. It allows wireless network coverage to be expanded with multiple access points. The condition of WDS AP mode should be set as the same channel, encryption, and IP/network segment.

Advanced Setting

In Advanced setting, there're further wireless network configurations for whom needs to adjust in transmission.

Advanced Settings

Transmit Power:	25 dbm
Cilent Isolation:	Disable
DFS:	Disable
RTS/CTS Threshold:	0 bytes
Beacon Interval:	100 milliseconds
DTIM:	1
Software Retry Tx:	3
Roaming Threshold:	-94 dBm
Short GI:	800 ns
Fragment Size:	2346 bytes
Aggregation:	Enable
Aggregated Frames Number:	32
Maximum Aggregated Size:	50000
Tx ChainMask:	2 Chain
Rx ChainMask:	2 Chain
PoE Pass Through:	OFF Set

Apply

Transmit Power	Defines the maximum average transmit output power (in dBm) of the device. The transmit power level maximum is limited according to country regulations.
RTS/CTS	Determines the packet size of a transmission and, through the use

Threshold	of an AP, helps control traffic flow. The range is 0-2346 bytes.
Beacon Interval	Beacons are the packets sending by Access point to synchronize the wireless network. The beacon interval is the time interval between beacons sending by this unit in AP or AP+WDS operation. The default and recommended beacon interval is 100 milliseconds.
DTIM	This is the Delivery Traffic Indication Map. It is used to alert the clients that multicast and broadcast packets buffered at the AP will be transmitted immediately after the transmission of this beacon frame. You can change the value from 1 to 255. The AP will check the buffered data according to this value. For example, selecting "1" means to check the buffered data at every beacon.
Roaming Threshold	Defines the minimum client signal level accepted by the AP for the client to connect.
Short GI	Guard intervals are used to ensure that distinct transmissions do not interfere with one another. Only effect under Mixed Mode.
Fragment Size	A large data frame is fragmented into several fragments each of size equal to fragment threshold. By tuning the fragment threshold value, we can get varying fragment sizes.
Aggregation	A part of the 802.11n standard that allows sending multiple frames per single access to the medium by combining frames together into one larger frame. It creates the larger frame by combining smaller frames with the same physical source, destination end points, and traffic class (QoS) into one large frame with a common MAC header
Aggregated Frames Number	Determines the number of frames combined in the new larger frame.
Maximum Aggregation Size	Determines the size (in bytes) of the larger frame.
Tx/Rx Chain Mask	Displays the number of independent spatial data streams the device is transmitting (TX) and receiving (RX) simultaneously within one spectral channel of bandwidth. Multiple chains increase data transfer performance significantly.
PoE Pass Through	It allows Secondary Ethernet port to provide 24V power for a secondary device when it enabled.

Security

The security setting includes WEP and WPA encryption with enhanced options.

Security Settings

Encryption: None ▾

None | No security applied

Apply

WEP

WEP (Wired Equivalent Privacy) is the basic security algorithm for data encryption and supports 64/104/128 bits length.

Security Settings

Encryption: WEP ▾

WEP | Simple WEP Security

WEP Mode: Open ▾

Key Length: 64-bit ▾

Key 1 ○ [ ] ASCII (5 characters) ▾

Key 2 ○ [ ] ASCII (5 characters) ▾

Key 3 ○ [ ] ASCII (5 characters) ▾

Key 4 ○ [ ] ASCII (5 characters) ▾

Apply

WPA

Wi-Fi Protected Access (WPA) and Wi-Fi Protected Access II (WPA2) developed by the Wi-Fi Alliance are two advanced security protocols, and it's popular used in securing wireless computer networks.

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Security Settings

Encryption: [WPA ▼]

WPA

WPA Mode: [WPA ▼]

Enhanced Security for: [Personal Shared Key (Preshared Key) ▼]

Preshared Key: [   ] (8 to 63 characters)

Cipher: [TKIP ▼]

[Apply]

Enhanced Security	Specify one of the following WPA key selection methods.
Preshared Key	Specify a passphrase. The preshared key is an alphanumeric password between 8 and 63 characters long.
Cipher	Select **TKIP**, **AES**, or **AUTO** for WPA algorithms.

MAC Address Control

The MAC Address Control will allow/deny any AP client connect to router.

MAC Access Control

MAC Access Control: [Disable ▼]

MAC Address: [   ]

[Add]

[Apply]

MAC Access Control	MAC access control is implemented using an IP tables (routing) firewall that protects the resources of a private network from outside threats by preventing unauthorized access and filtering specified types of network communication.
MAC address	The network device identified by its MAC address.

Information

There're five sub-menus in Information menu including Status, Statistics, Association List, Memory Utilization, and Routes.

Status

It shows the present overview of LP-2596K system configurations..

Status   Refresh

Radio
Band: 11NAHT40
Mode: AP
Encryption: None
SSID: LP-2596K
Current Frequency: 5.18 GHz
MAC Address: 00:1a:ef:42:6f:5a
Current TX Power: 25 dBm
Link Status: Check

LAN
IP Address: 192.168.1.200
Subnet Mask: 255.255.255.0
MAC Address: 00:1a:ef:42:6f:59

System
System Uptime(Day Hr:Min:Sec):   00 00:23:36
Current Time(Yr-Mon-Day Hr:Min:Sec):   2013-01-01 03:42:02
Device Name: LP-2596K
Hardware Version: v1.3
Software Version: v1.02.08

Statistics

It shows the statistic data flow of Wireless and LAN interface in LP-2596K.

Statistics

Wireless

	bytes	packets	errors	drop
Receive:	0	0	0	0
Transmit:	0	0	0	510

LAN

	bytes	packets	errors	drop
Receive:	240675	2369	0	38
Transmit:	654899	2010	0	0

Refresh   Reset

Association List

It shows which device and its connection information to LP-2596K.

Association

MAC Address	Channel	Tx Rate (Mbps)	Signal Strength (dbm)

Refresh

Memory Utilization

It presents the status of LP-2596K memory utilization.

Memory Utilization

Total Available:	73%	47844 KB / 65536 KB
Used:	18%	8956 KB / 47844 KB
Free:	80%	38720 KB / 47844 KB
Buffers:	0%	0 KB / 8956 KB
Cached:	26%	2368 KB / 8956 KB

Refresh

Routes

It presents LP-2596K device route.

Routes

```
Destination    Gateway        Genmask         Flags Metric Ref    Use Iface
192.168.1.0    0.0.0.0        255.255.255.0   U     0      0        0 br0
```

Refresh

Note. It will be enabled when operation mode is switched to Wireless ISP.

Maintenance

In Maintenance, it contains of Account and Firmware Upgrade submenu.

Account
It allows user to change password setting .

Password Setup

User name:	admin
Old password:	
New password:	
Confirm new password:	

Apply

Firmware Upgrade
*Click the **Browse** button to select the new firmware image file on PC. And click the **Upgrade** button to upgrade firmware.*

Firmware Upgrade

Select file: [   ] Browse... Upgrade

Note. Please do not take off the power or remove the Ethernet cable connected to LP-2596K when firmware upgrade is in process. Otherwise, it will probably cause system crush.

System

There're four parts in System menu including Backup Settings, Time Settings, Service Settings and Log.

Backup Settings

It consists of Back Up configuration, Restore Configuration, System Reboot and System Reset.

Miscellaneous

Back Up Configuration:	[Save]
Restore Configuration:	[Upload]
System Reboot:	[Reboot]
Reset device to factory default:	[Reset]

Time Settings

Time Settings

Current Time: 2013-01-01 05:32:10   [Refresh]

SNTP Client: Disable ▾
SNTP Server IP :   64 . 90 . 182 . 55
Time Zone :   GMT ▾

System Time Setup: Year   Month   Day   Hour   Minute   Second
                      2014 ▾   02 ▾   12 ▾   19 ▾   58 ▾   49 ▾

[Save]

SNTP Client	Enable or Disable SNTP Client function.
SNTP Server IP	Enter the IP address of SNTP server.
Time Zone	Select the time zone in your country from pull-down menu.

Service Settings

It includes SNMP configuration, HTTPS secure connection, Telnet, and SSH setting.

Services Settings

SNMP Configuration

Read Community: `public`

Write Community: `public`

Trap IP 1: `192` . `168` . `1` . `1`

Trap Community 1: `private`

System Contact:

System Location:

Use Secure Connection

HTTPS: `Disable ▾`

Secure Server Port: `443`

Server Port: `80`

Telnet Configuration

Telnet Server: `Enable ▾`

Server Port: `23`

SSH Configuration

SSH Server: `Disable ▾`

Server Port: `22`

Apply

Log

System Log

System Log:	Disable ▾
System Log Server:	Disable ▾
System Log Server IP:	___ . ___ . ___ . ___
System Log Server Port:	___

[Refresh] [Clear] [Apply]

System Log	This option enables the registration routine of system log (syslog) messages. By default it is disabled.
Log Server IP	The host IP address that receives syslog messages.
Log Server Port	The TCP/IP port that receives syslog messages.

Compliance

Federal Communication Commission Interference Statement

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

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

FCC Caution:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

RF Radiation Exposure and Hazard Statement:

To ensure compliance with FCC RF exposure requirements, this device must be installed in a location such that the antenna of the device will be greater than 20 cm (8 in.) away from all persons. Using higher gain antennas and types of antennas not covered under the FCC certification of this product is not allowed. Installers of the radio and end users of the product must adhere to the installation instructions provided in this manual. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Non-modification Statement:

Use only the integral antenna supplied by the manufacturer when operating this device. Unauthorized antennas, modifications, or attachments could damage the TI Navigator access point and violate FCC regulations. Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.