

S1000R

User Guide



Table of Contents

Introduction	1
Using this guide	2
Getting Started	3
What's in the box.....	3
Setup at a glance.....	4
Setting up your S1000R	5
Begin Self-Installation	8
Configuring the S1000R Router	9
Logging into the router	9
Configuring WiFi service	10
Using the S1000R.....	20
How the S1000R works.....	20
?????.....	20
Maintenance	20
Troubleshooting	21
Router connection problems.....	21
LED quick reference.....	22
Using LEDs.....	22
Resetting the S1000R.....	24
FAQs	25
Why does the S1000R need an external GPS antenna?	25
What should I do if the GPS fails to acquire a lock?	25
What happens to the S1000R if there is a power outage or if you lose Internet access?..	25
Can you move the S1000R to another location?	25
Getting help	25
Safety information	26
General precautions.....	26
FCC information.....	26
! FCC radiation exposure statement.....	26
FCC Part 15.....	27

Introduction

The S1000R is a variant of CommScope's S1000 platform that uses LTE relay for backhaul connection to Sprint's core network.

The S1000R combines S1000 hardware with Sercomm's Customer Premise Equipment (CPE) module. The CPE module provides access to user equipment through the backhaul.

The S1000's WAN Ethernet port connects to the CPE module's LAN Ethernet port internally, providing data communication, management and packet forwarding.

Using this guide

This user guide introduces you to the services and features of the S1000R. The guide is divided into the following chapters:

- [Getting Started](#)
- [Configuring the S1000R Router](#)
- [Using the S1000R](#)
- [Troubleshooting](#)
- [Safety information](#)

It is important that you read each section and note any special requirements before you use the device.

 **Please read the [Safety information](#) to learn about how to safely use your device. Failure to read and follow the safety information in this user guide may result in serious bodily injury, death, or property damage.**

Getting Started

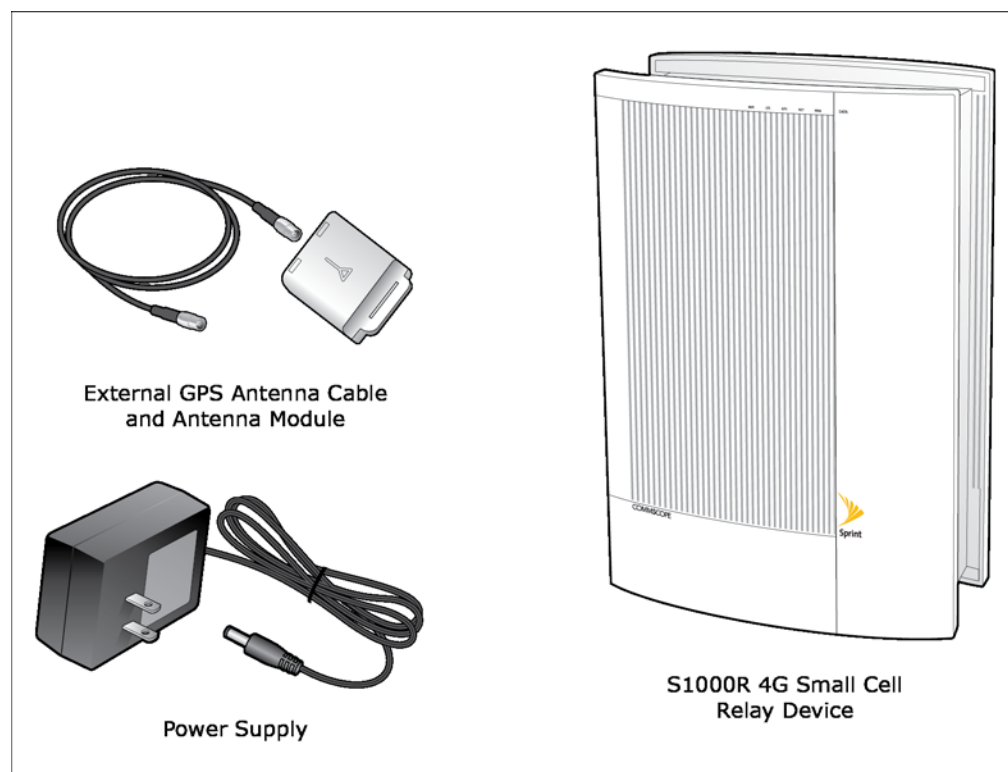
This chapter describes the contents of the box and setting up your S1000R.

- [What's in the box](#)
- [Setup at a glance](#)
- [Setting up your S1000R](#)
- [Begin Self-Installation](#)

NOTE: When you complete this section, configure WiFi and other services in [Configuring the S1000R Router](#).

What's in the box

Ensure that the following items are in the box, along with the Quick Start Guide.

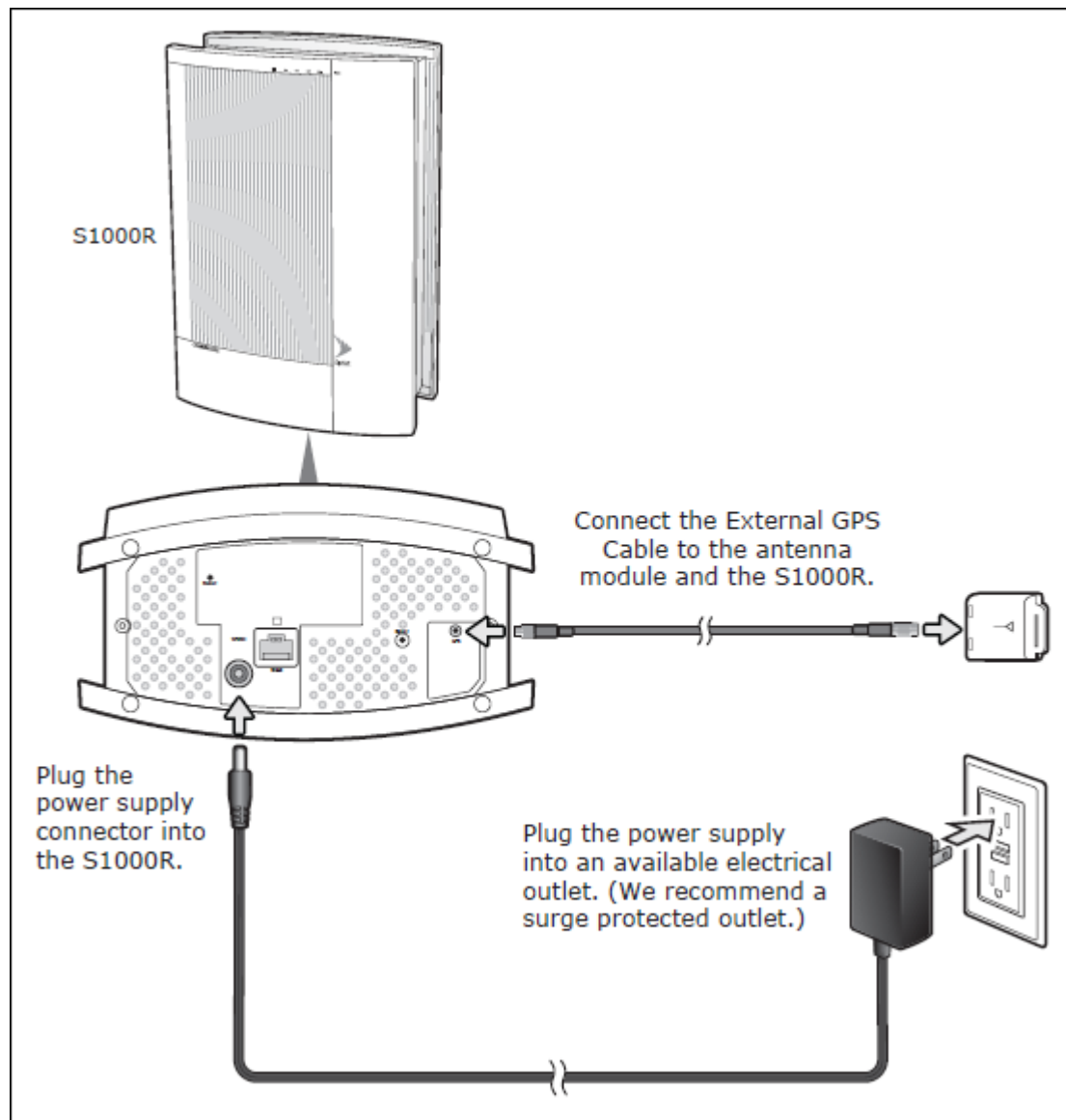


Setup at a glance

The following diagram shows a typical S1000R setup.



Place the unit on its side on a flat surface to expose the bottom of the unit.

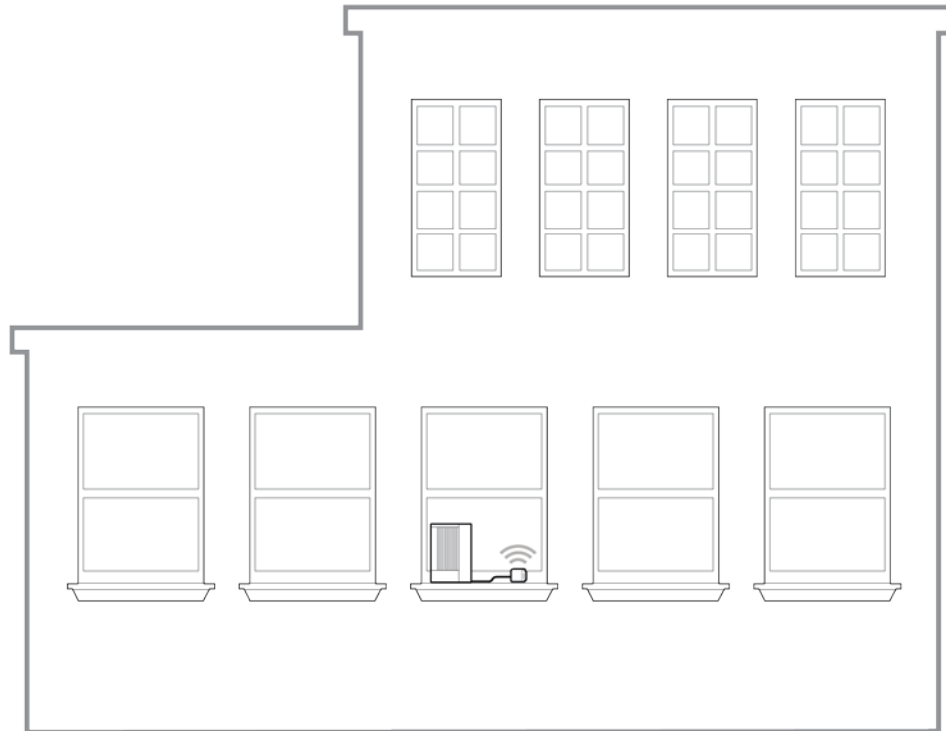


Setting up your S1000R

Follow these steps to install your S1000R inside your office or other location.

Place the unit

The following diagram shows a typical placement of an S1000R in a building.



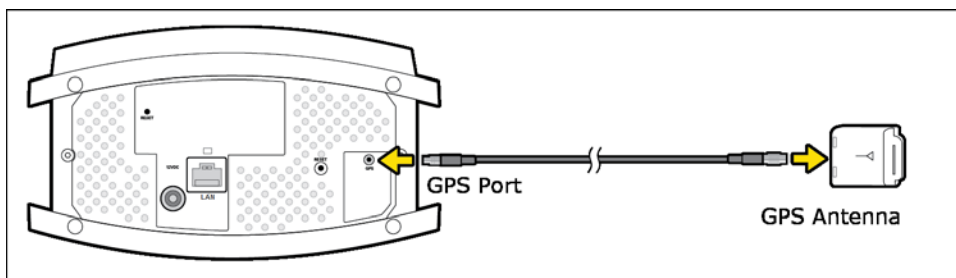
Place the device:

- In an elevated location, such as the top of a bookshelf or on a window sill.
- Position the 5 LEDs away from the window to maximize accessibility to Macro signals
- Within reach of an electrical outlet

NOTE: Do not put the device next to any devices that may cause radio interference.

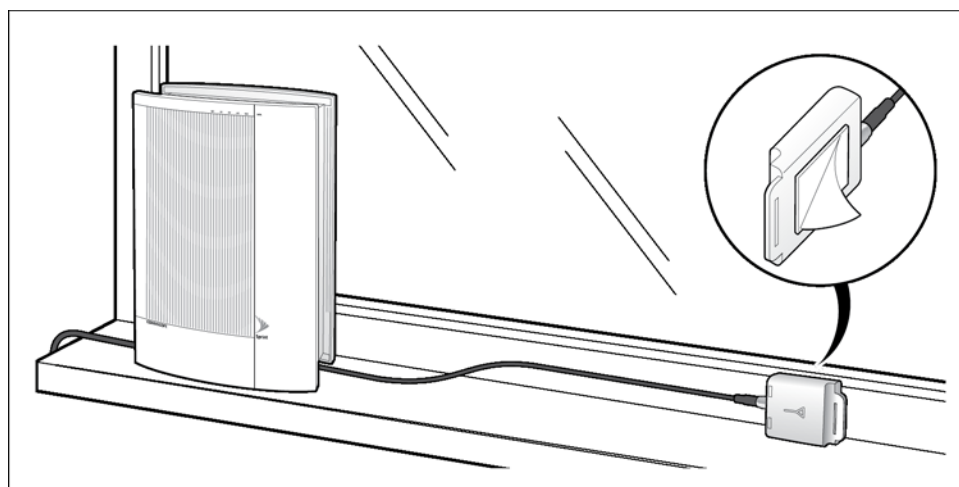
Connect the external GPS antenna

1. Connect the external GPS cable to the GPS port on the bottom of the unit.



2. Position the GPS antenna module on a flat surface near a closed window.

NOTE: You may defer step 2 until after the unit has been placed upright in the next section.



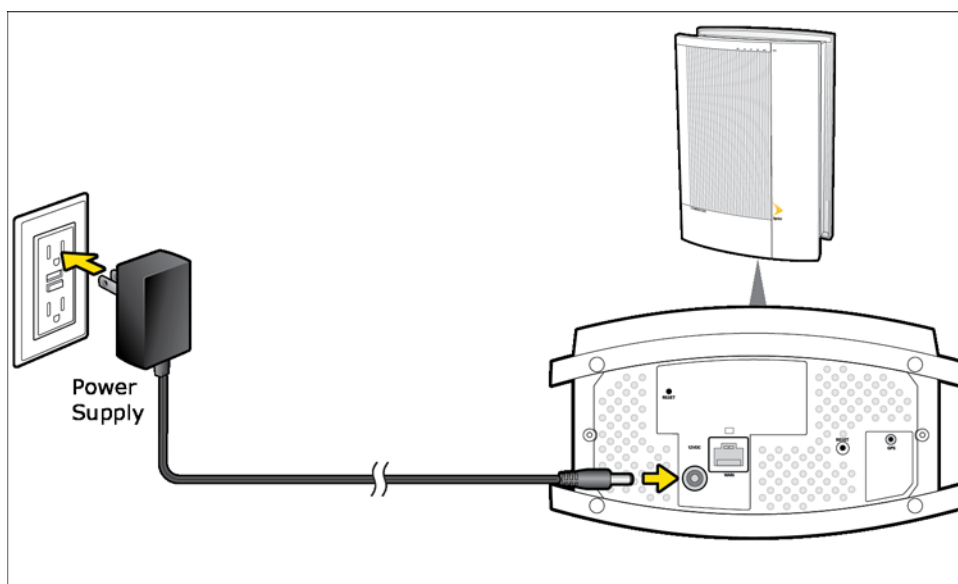
Do not place the GPS antenna:

- Outdoors; it is not weatherproof.
- Behind large, heavy objects such as furniture; doing so could affect the signal.

NOTE: After initial installation, GPS may take 30-40 minutes to get a GPS time fix.

Connect the power supply

1. Plug the power supply connector into the black power port.



Stand the unit upright and carefully move all cables so they come out of one long end of the unit. There is room for cables to come out from beneath the unit once it is placed upright.

1. Plug the other end of the power cable into an available electrical outlet. (*We recommend a surge protected outlet.*)

Begin Self-Installation

When you power on your S1000R for the first time, it will go through an automated setup sequence.

1. During boot-up the device LEDs will be solid green for a few seconds during initial hardware tests. This takes approximately 8 to 10 seconds.
2. The WAN LED will turn solid green; all other LEDs will be OFF. This takes approximately 8 to 10 seconds.
3. The WAN LED will stay solid green; all other LEDs will blink red.

NOTE: Steps 1 through 3 are expected behavior.

4. The NET LED will turn solid green. This will take approximately 15 minutes.

NOTE: If the WAN or NET LEDs are solid red after 15 minutes, talk to your IT administrator to diagnose problems with your internet connection.

5. This is a good time to take a break.

The device will go continue the self-installation process. During this time the device may download software images and perform automatic synchronization. The device may also restart a couple of times.

Return after 60 minutes and check the LEDs. All LEDs should be solid green.

LED Label	Description when solid Green
WAN	Successful connection to the local LAN
NET	Successful connection to Sprint's Core Network
GPS	GPS lock achieved
LTE	4G Data Services are available
WIFI	WiFi Services are available

NOTE: If all LEDs are not solid green call Customer Care as described in [Getting help](#).

Configuring the S1000R Router

This section describes how to configure the S1000R's internal router. Use the router to configure WiFi settings.

- [Logging in to the router](#)
- [Configuring WiFi service](#)

NOTE: To access the internal router, connect a computer to the LAN port on the bottom of the unit.

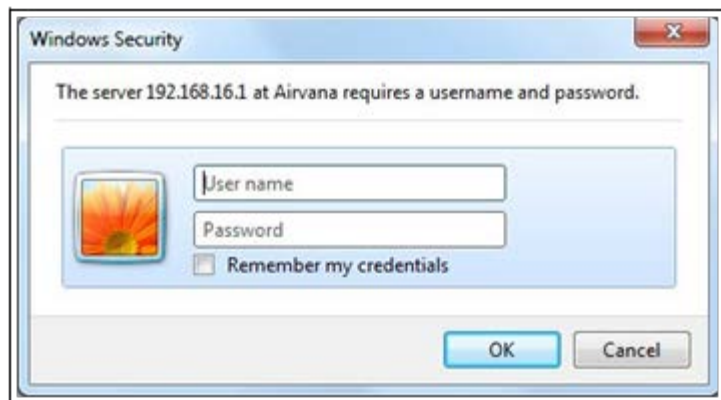
Logging into the router

1. Connect a computer to the LAN port.
2. Start the computer. (If it is already running, restart it.)
3. In a web browser, enter the following URL:

http://192.168.16.1

NOTE: This IP address is the LAN bridge IP address.

The login dialog box appears.

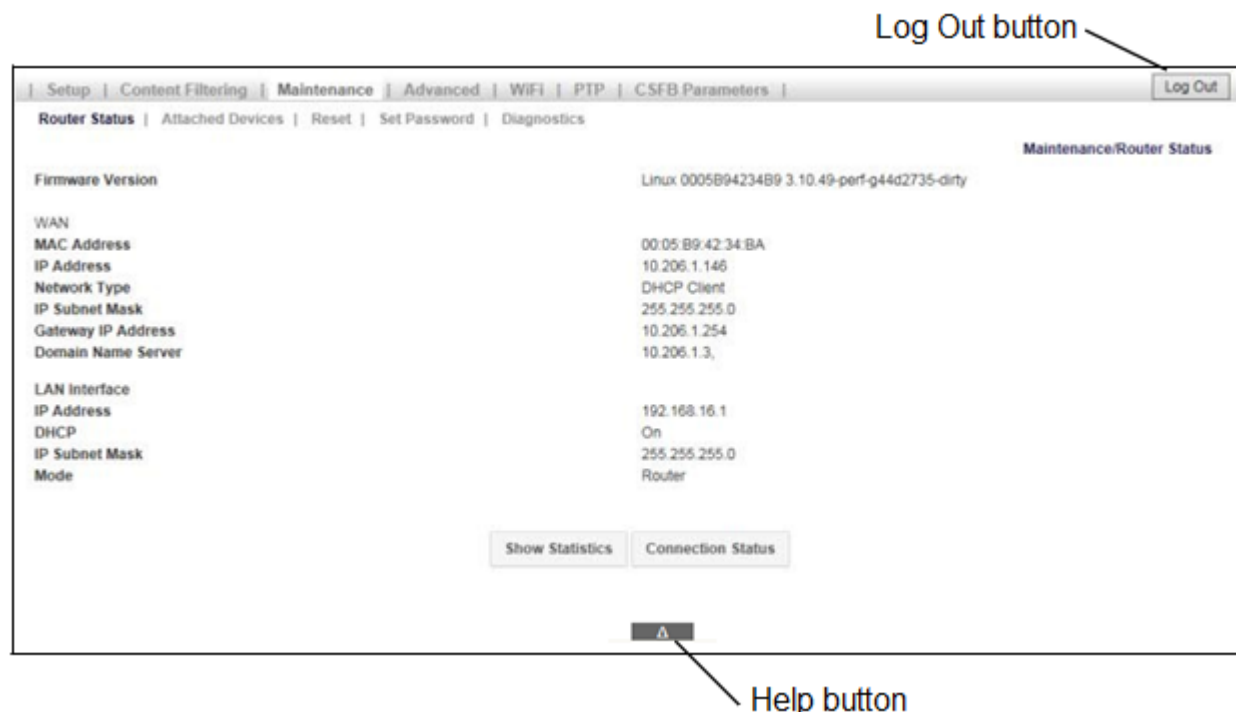


4. Enter the User name 'admin' and the Password 'admin'.
5. Click **OK**.

NOTE: If you cannot connect to the router, diagnose the problem using the steps in section [Router connection problems](#).

Home page

When connected to the router, the Router Status screen appears as shown below.



Main menu

The main menu, on the top of the screen, contains a menu bar to access the major screens.

The main menu also contains the following buttons:

- **Log Out** - When finished, click this button to log out.
- **Help** - Located at the bottom of the screen, click to view help for the current screen.

Navigation and data input

Use the menu bar on the top of the screen and the browser's Back button to navigate.

You must click **Save** before changing screens or the software does not save changes.

Configuring WiFi service

Follow this section to setup the S1000R's WiFi service. You will create and configure SSIDs in the router.

1. Log into the S1000R router by following the procedure in [Logging into the router](#).
2. From the Home page click **WiFi** -> **Basic Settings**.

Basic Settings

The Basic Settings tab allows you to enable and configure the two radios available in the S1000R.

Radio 1 has a frequency of 5.0 GHz and Radio 2 has a frequency of 2.4 GHz.

The screenshot shows the 'Basic Settings' tab for the S1000R router. It is divided into two columns: 'Radio 1 (Frequency: 5.0 GHz)' and 'Radio 2 (Frequency: 2.4 GHz)'. Both radios are enabled. Radio 1 settings include Operating Mode: IEEE 802.11a + IEEE 802.11n + IEEE 802.11ac, Channel Bandwidth: 40 MHz, Auto Channel Scan: checked, Channel Number: Channel 36, and Extension Channel: Above Control Channel. Radio 2 settings include Operating Mode: IEEE 802.11b + IEEE 802.11g + IEEE 802.11n, Channel Bandwidth: 40 MHz, Auto Channel Scan: checked, Channel Number: Channel 1, and Extension Channel: Above Control Channel. There are Apply and Cancel buttons at the bottom.

Parameter	Description
Enable Radio	Enable or disable Radio 1 and Radio 2
Operating Mode	The following options are supported on Radio 1: • IEEE 802.11ac • IEEE 802.11n • IEEE 802.11a The following options are supported on Radio 2: • IEEE 802.11n • IEEE 802.11g • IEEE 802.11b
Channel Bandwidth	The following channel bandwidths are supported on Radio 1 and Radio 2: • 20MHz • 40 MHz • 80 MHz

Auto Channel Scan	Check/uncheck the box to enable/disable auto channel scan.
Channel Number	This field shows the list of available channels under the respective radio. NOTE: To select a channel manually, the Auto Channel Scan option must be disabled.
Extension Channel	Automatically selected based on the selected channel. NOTE: For 2.4 GHz radio, this configuration will be enabled for selected channels, allowing the user to optionally select "Above Control Channel", or 'Below Control Channel'.

Mode	Channel Bandwidth	Data Rates
Radio 1 (5 GHz)		
IEEE 802.11ac	20 MHz	Up to 173.3 Mbps
	40 MHz	Up to 400 Mbps
	80 MHz	Up to 866.7 Mbps
IEEE 802.11n	20 MHz	Up to 72.2 Mbps
	40 MHz	Up to 150 Mbps
IEEE 802.11a	20 MHz	Up to 54 Mbps
Radio 2 (2.4 GHz)		
IEEE 802.11n	20 MHz	Up to 72.2 Mbps
	40 MHz	Up to 150 Mbps
IEEE 802.11g	20 MHz	up to 54 Mbps
IEEE 802.11b	20 MHz	Up to 11 Mbps

NOTE: It is recommended to keep the ACS (Auto Channel Select) feature checked. This feature ensures that the device will be able to select the most optimal available channel, even in a congested RF environment.

Multiple SSID Setup

The router supports twelve SSIDs. Eight SSIDs are Private and user configurable; four are Public and configured only by the Operator.

- Click **Multiple SSID Setup**.

NOTE: Public SSIDs can only be enabled or disabled in the router. Public SSIDs are configured from the Operator.

[Setup](#) | [Content Filtering](#) | [Maintenance](#) | [Advanced](#) | [WiFi](#) | [PTP](#) | [CSFB Parameters](#) | [Log Out](#)

[Basic Settings](#) | **Multiple SSID Setup** | [Advanced Setup](#) | [MAC Address Filtering](#)

List of SSIDs

Edit	Enable	SSID	SSID Status (5.0GHz - 2.4GHz)	Security Mode	Visibility	Max. Stations Per Radio
	☒	AIRV_3599	Enabled - Enabled	WPA2 - Personal	☒ Visible	16
	☐	cpe-WifiPvt2	Disabled - Disabled	WPA2 - Personal	☒ Visible	16
	☐	cpe-WifiPvt3	Disabled - Disabled	WPA2 - Personal	☒ Visible	16
	☐	cpe-WifiPvt4	Disabled - Disabled	WPA2 - Personal	☒ Visible	16
PUBLIC SSIDs:						
	☒	AIRV-PublicId1	Enabled - Enabled	WPA/WPA2 - Enterprise	Visible	16
	☒	AIRV-PublicId2	Enabled - Enabled	WPA/WPA2 - Enterprise	Visible	16

Notes / Instructions:

1. To edit any SSID (except primary SSID), you must disable it.
2. SSID, Passphrase or Radius Server Shared Secret must consist of alphabets, numbers & special characters such as ! # \$ % & ' () * + , - . / : ; < = > ? [\] ^ _ { | } ~ .
3. The PUBLIC SSIDs are not configurable. These SSIDs can only be enabled/disabled.
4. The value specified for Max. Stations is per Radio basis and not per SSID basis.
For eg: If the value for Max. Stations is configured as 5, then the Maximum number of stations allowed for that SSID is 5*5 i.e. 10 stations.

Parameter	Description
SSID	The name of the network to which a device associates.
Enable	To enable/disable a SSID, check/uncheck the box for the SSID. Click Apply .
Status	Shows the status of a SSID per Radio.
Security Mode	Shows the security mode in which the SSID is currently operating. By default, the security mode is WPA2-Personal for Private SSIDs.
Visibility	To enable/disable SSID broadcasts, check/uncheck the box for each of the Private SSIDs and click Apply .

Max. Stations Per Radio	This feature can be used to restrict the number of connections per SSID. A minimum of one station and a maximum of 128 stations can be specified per SSID. The maximum stations per radio is for the number of radios and not for SSIDs. For example, if the value of Max. Stations Per Radio is configured for 5, the maximum stations allowed for that SSID is 5 + 5, or 10 stations.
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To edit an SSID

1. Find the SSID you want to modify, disable it (uncheck the Enable box), then click **Edit**.
2. Use the following tables to configure the SSID, then click **Save Changes**.

Parameter	Description
SSID Setup	

SSID	The name of the network to which a device can associate. SSID must be in the range of 1 to 32 characters, and must be unique. NOTE: If you want to change the name of the SSID, change the text of the SSID text box, then click Save Changes. All SSID values will remain the same; only the name will change.
Wireless Security	
Security Mode	The security mode in which the SSID is currently operating. Valid values: • open • WPA-Personal • WPA-Enterprise • WPA2-Personal • WPA2-Enterprise • WPA/WPA2-Personal • WPA/WPA2-Enterprise NOTE: For Enterprise versions, a RADIUS server based security check is performed. You will enter these values for Radius Server: • Server IP Address (A.B.C.D) • Server Port (Range: 1 to 65535, Default: 1812) • Server Shared Secret (WAP to Radius Server) • Server re-keying interval; this is the time after which the key must be re-generated. (Range: 600 to 7200 seconds, 0 - disable, Default: 600 seconds)
Cipher Type	This field can be set to one of the following options: • TKIP - Temporal Key Integrity Protocol • CCMP - Counter Mode CBC MAC Protocol • TKIP & CCMP

<Security Mode> - Personal	
Passphrase	Password required to associate with AP. This can be 8-63 ASCII characters.
Group Re-keying interval	The period of time between automatic changes of the group-key with the devices on the network.

SSID IP configuration

To configure the IP address and subnet for an SSID, navigate to **Advanced -> LAN IP Setup**. On this page, you can view the various subnets, including the default IP address range and subnet mask, for every WiFi SSID. You can edit these fields for each SSID by clicking the **Edit** button for the SSID and entering new values.

[Setup](#) | [Content Filtering](#) | [Maintenance](#) | [Advanced](#) | [WiFi](#) | [PTP](#) | [CSFB Parameters](#) | [Log Out](#)

[Dynamic DNS](#) | [LAN IP Setup](#) | [QoS Setup](#)

List of Subnets

SSID	IP Address	Subnet Mask	Starting IP	Ending IP	Edit
AIRV_3C77	192.168.17.1	255.255.255.0	192.168.17.10	192.168.17.200	Edit
cpe-WifiPvt2	192.168.18.1	255.255.255.0	192.168.18.10	192.168.18.200	Edit
cpe-WifiPvt3	192.168.19.1	255.255.255.0	192.168.19.10	192.168.19.200	Edit
cpe-WifiPvt4	192.168.20.1	255.255.255.0	192.168.20.10	192.168.20.200	Edit
AIRV-TEST1	192.168.21.1	255.255.255.0	192.168.21.10	192.168.21.200	Edit
AIRV-TEST2	192.168.22.1	255.255.255.0	192.168.22.10	192.168.22.200	Edit

Lan Interface Details

LAN	192.168.16.1	255.255.255.0	192.168.16.10	192.168.16.200	Edit
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☐ Default DMZ Server
 [Apply](#)

Parameter	Description
SSID	The name of the SSID
IP Address	The configured IP Address for the router for the SSID. Format: <A.B.C.D>

Subnet Mask	The configured subnet mask for the router in the SSID This is calculated by the router based on the IP Address. Format: <A.B.C.D> Default: 255.255.255.0
Starting IP	The starting range of the reserved pool of IP Addresses for this SSID.
Ending IP	The ending range of the reserved pool of IP Addresses for this SSID.
Edit	Click this button to edit the configuration for the SSID.
Lan Interface Details	
SSID	NOTE: All parameters described above apply to the SSID for the Local Area Network (LAN).
Default DMZ Server	When checked, the IP Address for this "Demilitarized zone" is the default server. The IP Address can be configured. NOTE: Use this cautiously, as there are security issues associated with a DMZ server.
Apply	Click this button to commit the configuration.

Advanced Settings

On the WiFi Advanced Setup page you can configure some WiFi advanced parameters such as Beacon Interval, Transmit Power and Block DFS channel. Generally, no configuration change is required on this page.

The screenshot shows the 'Advanced Settings' section of the WiFi configuration page. It features a table with three columns: 'Parameter', 'Radio 1 (Frequency: 5.9 GHz)', and 'Radio 2 (Frequency: 2.4 GHz)'. The parameters listed are 'Beacon Interval (in ms)', 'Transmit Power', and 'Block DFS Channels'. For Radio 1, the values are 600, High, and checked. For Radio 2, the values are 100, High, and Not Applicable. There are 'Apply' and 'Cancel' buttons at the bottom.

Parameter	Radio 1 (Frequency: 5.9 GHz)	Radio 2 (Frequency: 2.4 GHz)
Beacon Interval (in ms)	600	100
Transmit Power	High	High
Block DFS Channels	☒	Not Applicable

Parameter	Description
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Beacon Interval	Specifies the time in which a beacon packet must be broadcast. By default, all the SSIDs will be beaconing at an interval of 100msec. (Range: 50 msec to 3500 msec)
Transmit Power	This defines the strength of the signal being transmitted from a radio. By default, both the radios will be transmitting at the highest Transmit Power.
Block Dynamic Frequency Selection (DFS) Channels	This option allows the Auto Channel Selection (ACS) mechanism to either select/unselect DFS channels. The following channels are classified as DFS channels: 52,56,60,64,100,104,108,112,116,120,124,128,132,136,140 By default, the 5GHz radio will block all the DFS channels. One can enable the use of these channels by unchecking the checkbox and applying the settings. NOTE: It is NOT recommended to use these channels.

MAC Address Filtering

This feature is used to ALLOW or BLOCK MAC addresses from associating with a Private SSID.

By default, this feature is DISABLED on every Private SSID.

Parameter	Description
Add a MAC Address	To add a MAC address in the list, enter a valid MAC address in the text field provided under a SSID and click Add .
List of MAC Addresses	Displays the list of MAC addresses added.
MAC Command	This option is used to select the operation for the MAC addresses added in the list. • Allow these MAC Addresses – used to ALLOW only the MAC addresses added to the list • Block these MAC Addresses – used to BLOCK only the MAC addresses added to the list • Disable MAC Filtering – used to DISABLE MAC Address Filtering

Using the S1000R

This chapter describes how the S1000R works at a high-level, and provides maintenance guidelines.

- [How the S1000R works](#)
- [Maintenance](#)

How the S1000R works

?????

Maintenance

With normal use, S1000R is maintenance-free. Follow the recommendations below to ensure that it runs optimally.

Ventilation

The S1000R has ventilation slots that work best if you don't block the flow of air to them. For desk mounted devices, keep the device at least 2 inches (5 cm) from walls and other surfaces to ensure proper air flow.

Cleaning

Dust the S1000R occasionally to keep air vents clear of debris. Do not use liquid cleaners.

Troubleshooting

This chapter contains tips and procedures to help you troubleshoot your S1000R.

- [Router connection problems](#)
- [LED quick reference](#)
- [Using LEDs](#)
- [Resetting the S1000R](#)
- [FAQs](#)
- [Getting help](#)

Router connection problems

If you cannot connect to the S1000R router, there may be a problem with the router, use the following procedures to diagnose the problem.

Test for connectivity

If the router is properly installed, the LAN connection is OK, and it is powered ON, test the connection by using the Ping command:

- Open the command prompt window and enter the command:

ping 192.168.16.1
- If no response is received, either the connection is not working, or your PC's IP address is not compatible with the router's IP Address.

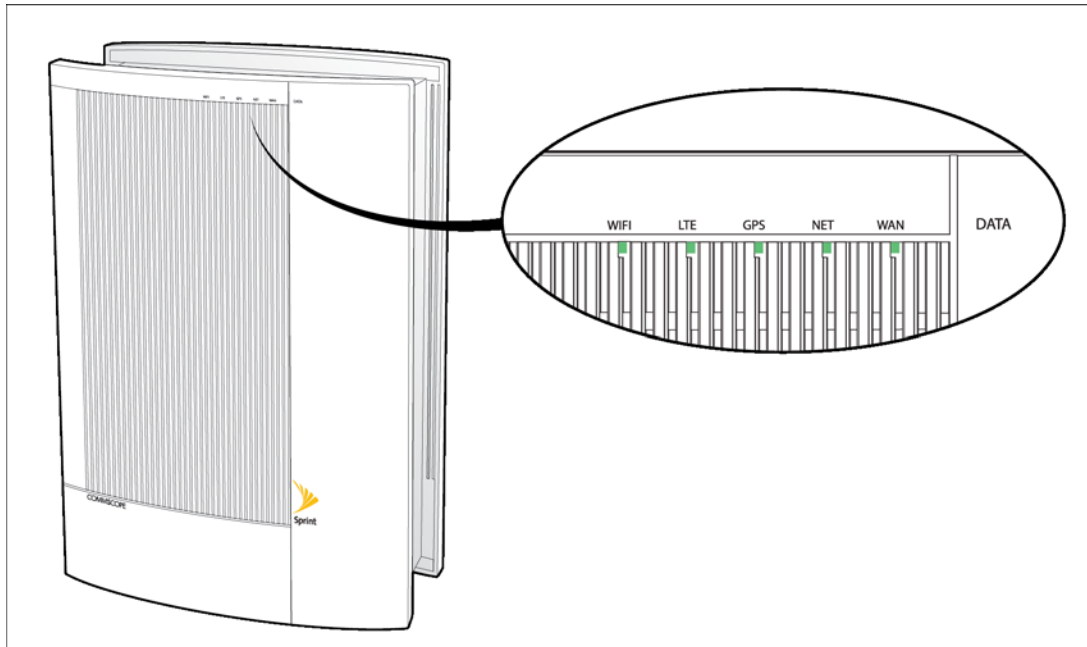
Verify IP addresses

If the PC is using a fixed IP address, its IP address must be within the range 192.168.16.2 to 192.168.16.254 to be compatible with the S1000 router's default IP address of 192.168.16.1. Also, the Network Mask must be set to 255.255.255.0.

- Refer to the CommScope S1000 Web GUI User Guide (913110) for details on checking the PC's TCP/IP settings.
- Ensure that your PC and the S1000R router are on the same network segment.
- Ensure you are using the wired LAN interface.

LED quick reference

The S1000R has a set of LEDs specific to Data services.



Using LEDs

Use the LEDs to troubleshoot your device.

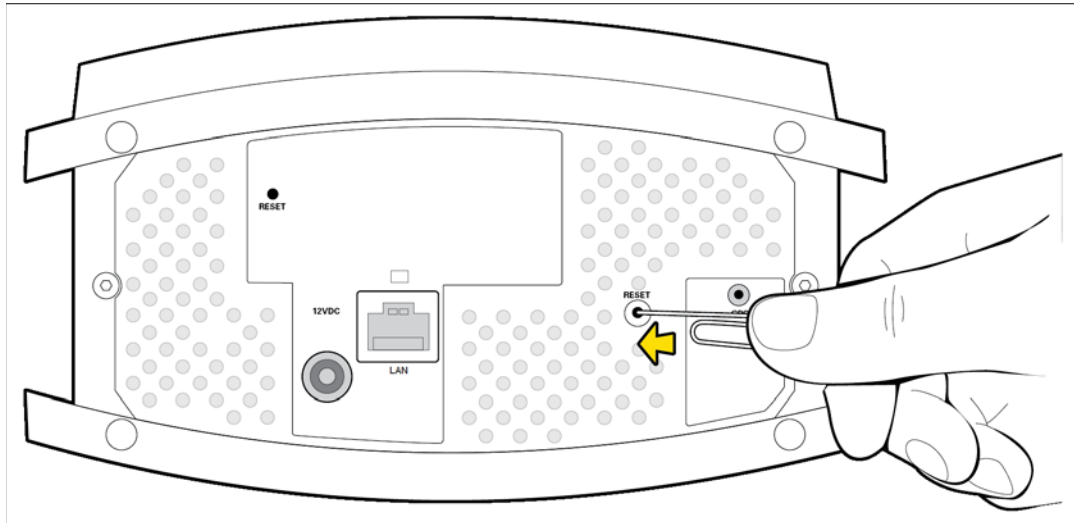
LED	Display pattern	Action to take
WAN	Solid Green	None. The LTE backhaul is operational with good signal quality.
	Solid Red	The LTE backhaul is non-operational. Contact Customer Support as described in Getting help .
	Blinking Red	The LTE backhaul is operational but with low signal quality. Contact Customer Support as described in Getting help .
	Off	Wait. The software is loading.
NET	Solid Green	None. The IPSec tunnel is established to the Operator's core network and is functioning properly.

	Solid Red	The IPSec tunnel to the Operator's core network is down, or has not established a connection (more than 15 minutes), or a hardware error occurred during startup. Contact Customer Care as described in Getting help .
	Blinking Red	Wait. The IPSec tunnel to the Operator's core network is establishing a connection.
	Off	Wait. The software is loading.
GPS	Solid Green	None. The GPS has acquired a lock and is ready.
	Solid Red	GPS error. GPS Time Fix has not been achieved since boot-up or DSP reload (30 minutes or more). Contact Customer Care as described in Getting help .
	Blinking Red	Wait. The GPS is acquiring a lock.
	Off	Wait. The software is loading.
LTE	Solid Green	None. LTE service is up.
	Solid Red	Service error. LTE service has not come up (30 minutes or more), or a hardware error occurred during startup. Contact Customer Care as described in Getting help .
	Blinking Red	Wait. LTE service is initializing.
	Off	The LTE service sector has been turned off by the Operator.
WIFI	Solid Green	None. The 2.4 GHz, 5.0 GHz or both WiFi services are up.
	Solid Red	Service error. WiFi service has not come up (30 minutes or more), or a hardware error occurred during startup. Contact Customer Care as described in Getting help .
	Blinking Red	Wait. WiFi service is initializing.
	Off	WiFi service has been turned off either by the Operator or via local device GUI.
ALL	Solid Red	Hardware error. A hardware error or hardware self-test occurred during startup. Contact Customer Care as described in Getting help .

Resetting the S1000R

The S1000R has a RESET button on the bottom of the unit, as shown in the following diagram.

If your S1000R operates properly for an extended period and the WAN LED suddenly starts blinking red, the S1000R may have a problem requiring a reset. To reset, push the RESET button for at least 10 seconds.



After resetting, your S1000R goes through an automated setup sequence. Refer to [Begin Self-Installation](#) for the setup sequence.

If the failure persists after resetting the S1000R, contact Customer Care. Refer to [Getting help](#).

FAQs

Why does the S1000R need an external GPS antenna?

The S1000R uses an external GPS antenna so that it can:

- Synchronize properly with the rest of the Operator's network.
- Determine and select the correct radio frequencies available in your area so that the S1000R uses the correct ones.

What should I do if the GPS fails to acquire a lock?

If the GPS LED does not turn solid green after 2 hours, call Customer Care as described in section [Getting help](#).

What happens to the S1000R if there is a power outage or if you lose Internet access?

During a power outage your device will not be operational. When power is restored and your internet connection comes up, your device will resume data services. If your device does not resume services, contact Customer Care as described in [Getting help](#).

Can you move the S1000R to another location?

Yes, you can move your device to another location within the Sprint network. Contact Customer Care for assistance. See [Getting help](#).

Getting help

If you need help with your S1000R, contact Customer Care.

- Online at [?????](#)
- By Phone: Sprint Customer Care (888-206-3585)
- **NOTE:** Call your Internet Service Provider for Internet access troubleshooting.

Safety information

This chapter contains safety information for your S1000R.

General precautions

- Dust the S1000R occasionally to keep air vents clear of debris. Do not wash it.
- The S1000R has ventilation slots that work best if you don't block them. Keep the S1000R at least 2 inches (5 cm) from walls and other surfaces to ensure proper air flow.
- Do not operate the S1000R in an extremely dusty or humid environment.
- Avoid placing the S1000R near radiators or other heating sources.
- Avoid locating the S1000R where it could be exposed to direct sunlight for prolonged periods.
- Do not connect the S1000R to a power strip containing an excessive number of other devices.
- Although your S1000R is quite sturdy, it is a complex piece of equipment and can be broken. Avoid dropping, hitting, bending, or sitting on it.
- Do not immerse the S1000R in water or get it wet. If your device does get wet, unplug it immediately until it dries.
- Do not allow children to play with the S1000R. They could hurt themselves and others or damage the device.

! For the best care of your S1000R, only Sprint-authorized personnel should service your device and accessories. Failure to do so may be dangerous and voids your warranty.

FCC information

FCC ID: QHY-S1000R

! FCC radiation exposure statement

This device complies with FCC's RF radiation exposure limits set forth for an uncontrolled environment under the following conditions:

- This device should be installed and operated such that a minimum separation distance of 8 inches (20 cm) is maintained between the radiator (antenna) and the user's or nearby person's body at all times.
- This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

For more information, see the publication Femtocells and Health at femtoforum.org or visit the FCC website at fcc.gov.

FCC Part 15

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.

This device 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 device 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 device does cause harmful interference to radio or television reception, which can be determined by turning the device off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Re-orient or relocate the receiving antennas of other devices.
- Increase the separation between the S1000R and other device receivers.
- Connect the S1000R into an outlet on a circuit different from that to which the other device receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.