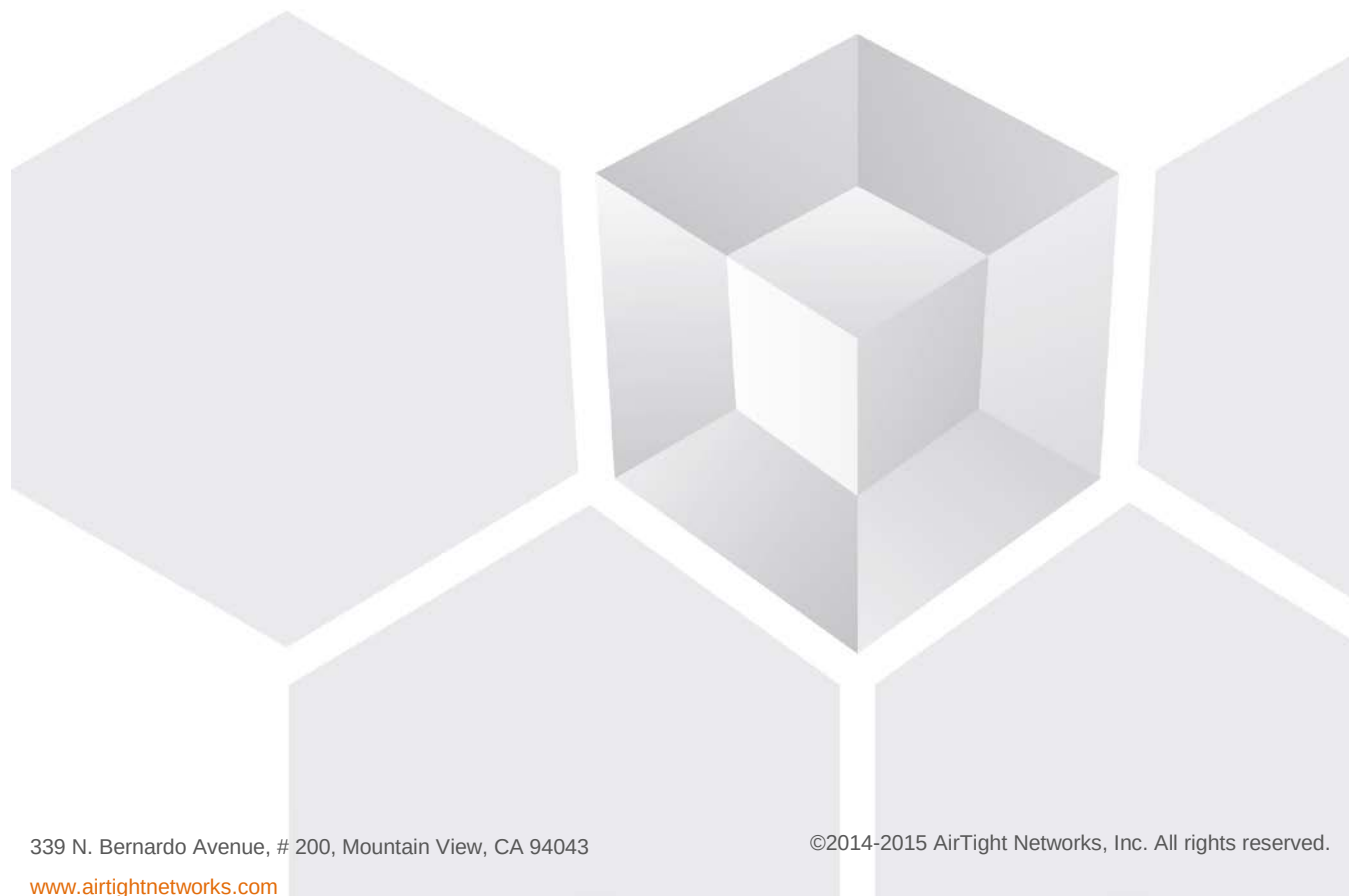


Installation Guide

C-65 Access Point/Sensor



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END USER LICENSE AGREEMENT

Please read the End User License Agreement before installing the C-65 Access Point/Sensor. The End User License Agreement is available at the following location <http://www.airtightnetworks.com/fileadmin/pdf/AirTight-EULA.pdf>.

Installing the C-65 Access Point/Sensor constitutes your acceptance of the terms and conditions of the End User License Agreement.

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Protected by one or more of U.S. patent Nos. 7,002,943; 7,154,874; 7,216,365; 7,333,800; 7,333,481; 7,339,914; 7,406,320; 7,440,434; 7,447,184; 7,496,094; 7,536,723; 7,558,253; 7,710,933; 7,751,393; 7,764,648; 7,804,808; 7,856,209; 7,856,656; 7,970,894; 7,971,253; 8,032,939; and international patents: AU 200429804; GB 2410154; JP 4639195; DE 60 2004 038 621.9; and GB/NL/FR/SE 1976227. More patents pending. For more information on patents, please visit: www.airtightnetworks.com/patents.

Federal Communication Commission Interference Statement

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

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

For operation within 5.15 ~ 5.25GHz / 5.47 ~5.725GHz frequency range, it is restricted to indoor environment. The band from 5600-5650MHz will be disabled by the software during the manufacturing and cannot be changed by the end user. This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

FOR MOBILE DEVICE USAGE (>20cm/low power) Radiation Exposure

Statement:

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

FOR COUNTRY CODE SELECTION USAGE (WLAN DEVICES)

Note: The country code selection is for non-US models only and is not available to all US models. Per FCC regulations, all Wi-Fi products marketed in the US must be fixed to US operation channels only.

Industry Canada Statement

This device complies with RSS-210 of the Industry Canada 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.

Ce dispositif est conforme à la norme CNR-210 d'Industrie Canada applicable aux appareils radio exempts de licence. Son fonctionnement est sujet aux deux conditions suivantes: (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

Caution

(i) The device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.

(ii) High-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices.

Avertissement

(i) les dispositifs fonctionnant dans la bande 5 150-5 250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;

(ii) De plus, les utilisateurs devraient aussi être avisés que les utilisateurs de radars de haute puissance sont désignés utilisateurs principaux (c.-à-d., qu'ils ont la priorité) pour les bandes 5 250-5 350 MHz et 5 650-5 850 MHz et que ces radars pourraient causer du brouillage et/ou des dommages aux dispositifs LAN-EL.

FOR MOBILE DEVICE USAGE (>20cm/low power)**Radiation Exposure Statement:**

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

Declaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

About this Guide

This installation guide explains how to mount the C-65 access point (AP)/sensor and the various configuration details.

Important! Please read the EULA before installing the C-65 device. Installation constitutes your acceptance of the terms and conditions of the EULA mentioned above in this document.

Intended Audience

This guide can be referred to by anyone who wants to install and configure the C-65 AP/Sensor.

Document Overview

This guide contains the following chapters:

1. Package Contents
2. C-65 Overview
3. Installing the C-65
4. Manually Configuring C-65
5. Config Shell Commands
6. Troubleshooting

Note: All instances of the term 'server' in this document refer to the AirTight Wi-Fi / AirTight WIPS server, unless the server name or type is explicitly stated.

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Tel: +1 650-961-1111
Fax: +1 650-963-3388

For technical support, send an email to support@airtightnetworks.com.

1. Package Contents

Please ensure that the items shown in Figure 1-1 are included in the C-65 device package:

Figure 1-1 C-65 Package Contents



C-65



Ceiling-Mount Accessories



Wall-Mount Accessories

Note: The MAC address of the device is printed on a label at the bottom of the product and the packaging box. Note down the MAC address, before mounting the device on the ceiling or at a location that is difficult to access.

If the package is not complete, please contact AirTight® Networks, Inc. technical support at support@airtightnetworks.com, or return the package to the vendor or dealer where you purchased the product.

2. C-65 Overview

C-65 is a 2x2:2 802.11 a/b/g/n/ac access point/sensor. This chapter provides an overview of the C-65 and describes front and the rear panels.

The front panel of the C-65 has 4 LEDs that indicate the working of the device.

Figure 2-1 Front Panel of C-65



The following table indicates the device states based on the LEDs.

Table 2-1 LED Details for C-65 in AP mode

Power	LAN1	2.4 GHz	5 GHz	Description
Off	Solid Green	Any	Any	Powered on and is working normally. The AP is connected to the server.
Off	Slow Blink	Slow Blink	Any	Upgrade is in progress.
Solid Orange	Off	Any	Any	Unable to get Ethernet link.
Solid Orange	Fast Blink	Any	Any	Did not receive a valid IP address via the DHCP.
Solid Orange	Slow Blink	Any	Any	Unable to connect to the server.
Off	Off	Off	Off	Not powered on or it is in the process of starting up.

Table 2-2. LED Details for C-65 in WIPS Mode

Power	LAN1	2.4 GHz	5 GHz	Description
Off	Solid Green	Solid Green	Solid Green	Powered on and is working normally. The AP is connected to the server.
Off	Slow Blink Green	Slow Blink Green	Any	Upgrade is in progress.
Solid Orange	Off	Any	Any	Unable to get Ethernet link.
Solid Orange	Fast Blink Green	Any	Any	Did not receive a valid IP address via the DHCP.
Solid Orange	Slow Blink Green	Any	Any	Unable to connect to the server.
Off	Off	Off	Off	Not powered on or it is in the process of starting up.
Off	Solid Green	Slow Blink Green	Solid Green	Prevention is in progress on 2.4GHz radio
Off	Solid Green	Solid Green	Slow Blink Green	Prevention is in progress on 5 GHz radio
Off	Solid Green	Fast Blink Green	Solid Green	Troubleshooting is in progress on 2.4 GHz radio
Off	Solid Green	Solid Green	Fast Blink Green	Troubleshooting is in progress on 5 GHz radio.

The rear panel of the C-65 has an Ethernet port labeled LAN1, that enables you to connect the device a wired LAN through a switch or a hub and provides the power for the device by using the 802.3af standard.

Note: If the channels for monitoring and prevention are not specified on the sensor radio, then the respective LED will have no activity and it will not glow.

Figure 2-2 Rear Panel of C-65

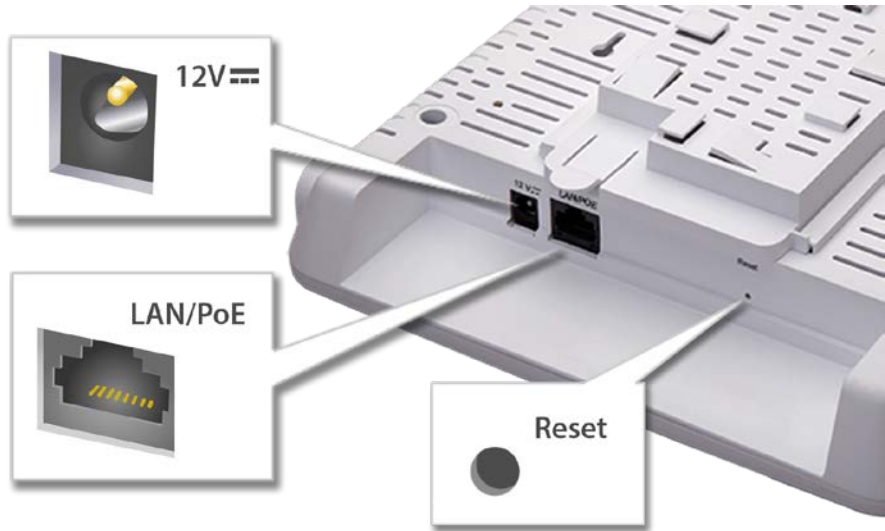


Table 2-3 Rear Panel Port Settings for C-65

Port	Description	Connector Type	Speed/Protocol
12V DC	Enables you to connect to and power on device using 12 V DC power with 2.5 ampere.	--	--
Ethernet (LAN/PoE)	Enables you to connect the device to a wired LAN through a switch or a hub. The device can then communicate with the server. This port also provides the power for the device using the 802.3af standard	RJ45	10/100/1000 Mbps Ethernet Power over Ethernet

The Reset Pin Hole is shown in the figure above. The Reset Pin Hole resets the C-65 device to factory defaults. To reset the device, power cycle the device (remove the power cable once and connect it back again) and while plugging the power cable back into the power source, press and hold down the Reset Pin Hole for 45 seconds until the power, LAN1, 2.4 GHz LEDs go green. Pressing the Reset Pin Hole while the device is running will not have any effect. When you reset the device, the following settings are reset:

- Config shell password is reset to **config**.
- Server discovery value is erased and changed to the default, **wifi-security-server**.
- All the VLAN configurations are lost.
- Device mode is changed to **Sensor Only**.
- If static IP is configured on the device, the IP address is erased and DHCP mode is set.

After reset, all the LEDs will blink once, indicating that the reset is successful, and the system boot sequence is initiated.

3. Installing the C-65

When the C-65 functions as a WIPS sensor, it monitors your network and communicates with the server to guard your corporate network against over-the-air attacks

Clients can connect to your corporate network in wireless mode through the C-65 AP(s).

The C-65 must be plugged into your corporate network to perform the above-mentioned operation.

As a WIPS sensor, C-65 can be configured in one of the following two modes:

- **Sensor Mode:** This is the default mode. In this mode, the device can be connected to a trunk port (802.1Q capable) on a switch. The device then monitors the VLANs that are configured on that trunk port and are chosen by the user. In this mode, an C-65 can monitor up to 16 VLANs. The wireless interface of the sensor is enabled for WIPS operations.
- **Network Detector (ND) Mode:** This mode needs to be explicitly configured. In this mode, the device can be connected to a trunk port (802.1Q capable) on a switch. The device then monitors the VLANs that are configured on that trunk port and are chosen by the user. In this mode, an C-65 can monitor up to 100 VLANs. The wireless interface of the ND is disabled.

Important: To prevent disconnection or tampering by unauthorized personnel, it is extremely important to install the device such that it is difficult to unplug the device from the network or from the power outlet.

Zero-Configuration of C-65 as Sensor

Zero-configuration is supported under the following conditions:

- The device is in sensor mode.
- A DNS entry **wifi-security-server** is set up on all the DNS servers. This entry should point to the IP address of the server. By default, the device looks for the DNS entry **wifi-security-server**.
- Sensor is placed on a subnet that is DHCP enabled.

Important: If the sensor is placed on a network segment that is separated from the server by a firewall, you must first open port 3851 for User Datagram Protocol (UDP) and Transport Control Protocol (TCP) bidirectional traffic on that firewall. This port number is assigned to AirTight® Networks. If multiple sensors are set up to connect to multiple servers, zero-configuration is not possible. In this case, you must manually configure the sensors. Refer to [Manually Configuring C-65](#) for further details.

The steps to install the sensor with no configuration (zero-configuration) are as follows.

1. Mount the sensor.
2. Power on the sensor.
3. Connect the sensor to the network.

Connecting C-65

This involves mounting the C-65, powering on the device, and connecting it to the wired network.

Mount C-65

Take a configured C-65, that is, ensure that a static IP is assigned to the device or the settings have been changed for DHCP. Note the MAC address and the IP address of the device in a safe place before it is installed in a hard-to-reach location. The MAC address of the device is printed on a label at the bottom of the product.

Recommended: You should label the devices using MAC addresses or at least your own convention. For example, use serial numbers, so that you can easily identify the devices.

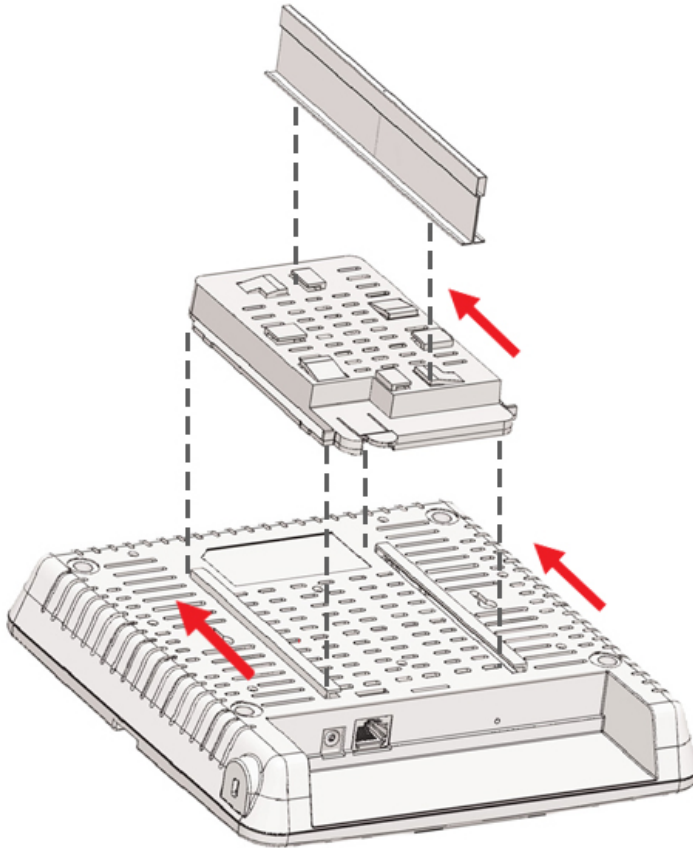
Ceiling Mounting

Use the mounting bracket to install the C-65 on the ceiling. To mount the device:

1. Attach the mounting bracket to the device.
2. Slide the device on to the T-rail affixed to the ceiling.

Given below is the diagrammatic representation of ceiling mounting of the C-65 device.

Figure 3-1 Ceiling Mounting



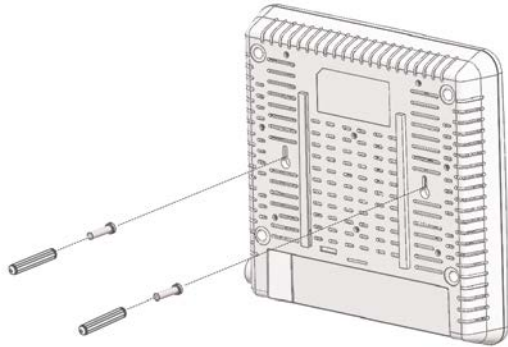
Wall Mounting

To mount the device on the wall, follow the steps given below.

1. Affix the screws on to the wall.
2. Mount the device on the screws.

Given below is the diagrammatic representation of wall mounting of the C-65 device.

Figure 3-2 Wall Mounting



Power On C-65

A C-65 device can be powered on by 802.3af Class 0 Power Over Ethernet (PoE) of Nominal input voltage 48V DC. You can connect the device to the network using PoE or a power adapter.

Connect C-65 to the Network

To connect C-65 to the network, perform the following steps.

1. Ensure that a DHCP server is already available on the network to enable network configuration of the C-65.
2. Add the DNS entry **wifi-security-server** on all DNS servers. This entry should point to the IP address of the server.
3. Ensure that DHCP is running on the subnet to which the device will be connected.

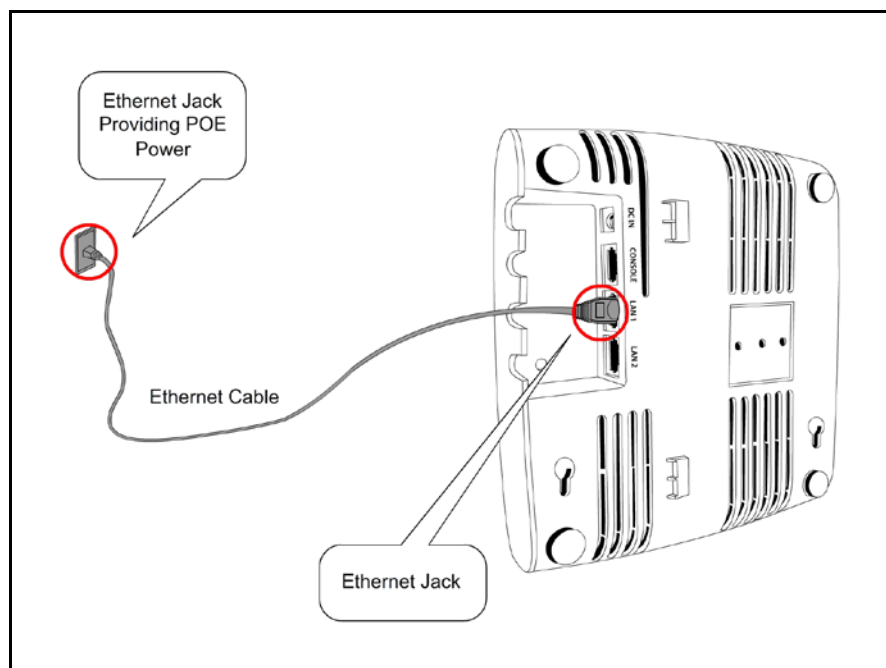
Important: If DHCP is not enabled on a subnet, the device cannot connect to that subnet with zero-configuration. If the DNS entry is not present on the DNS servers or you do not have the DHCP server running on the subnet, you must manually configure the device. Refer to [Manually Configuring C-65](#) for further details.

Using C-65 with PoE

To power on and connect C-65 to the network using PoE, do the following:

1. Connect one end of the network interface cable to the Ethernet port at the rear of the C-65.
2. Connect the other end of the network interface cable to the Ethernet jack that provides PoE power.

Figure 3-3. Power Up and Connect C-65 using PoE



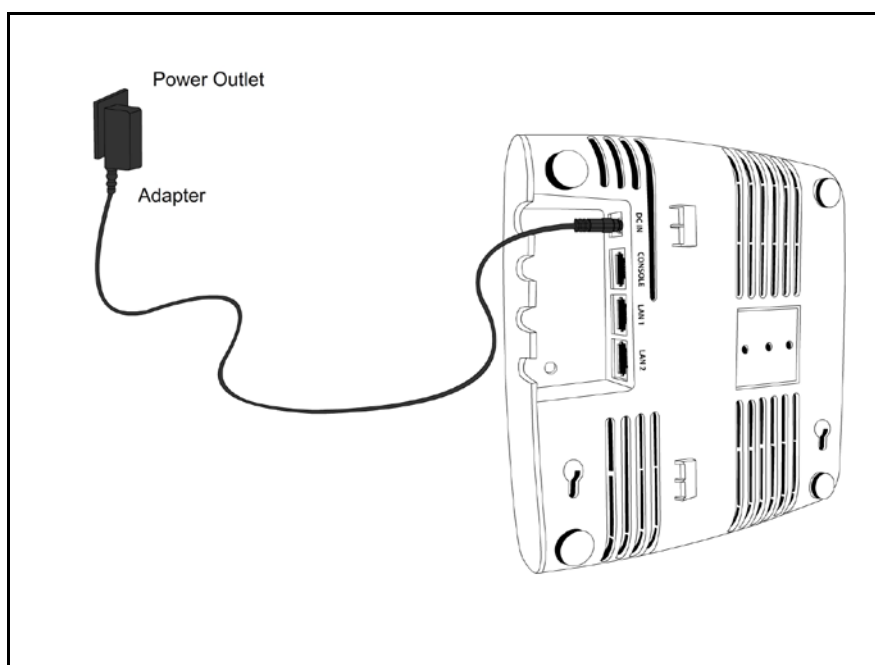
Using C-65 with power adapter

To power up the device, perform the following steps:

1. Plug the power cable into the DC power receptacle at the rear of the device.
2. Plug the other end of the power cable into an 110V~240V 50/60 Hz AC power source.

Wait until the device is ready. Refer to the respective LED details table based on the configured device mode.

Figure 3-4. Power Up C-65



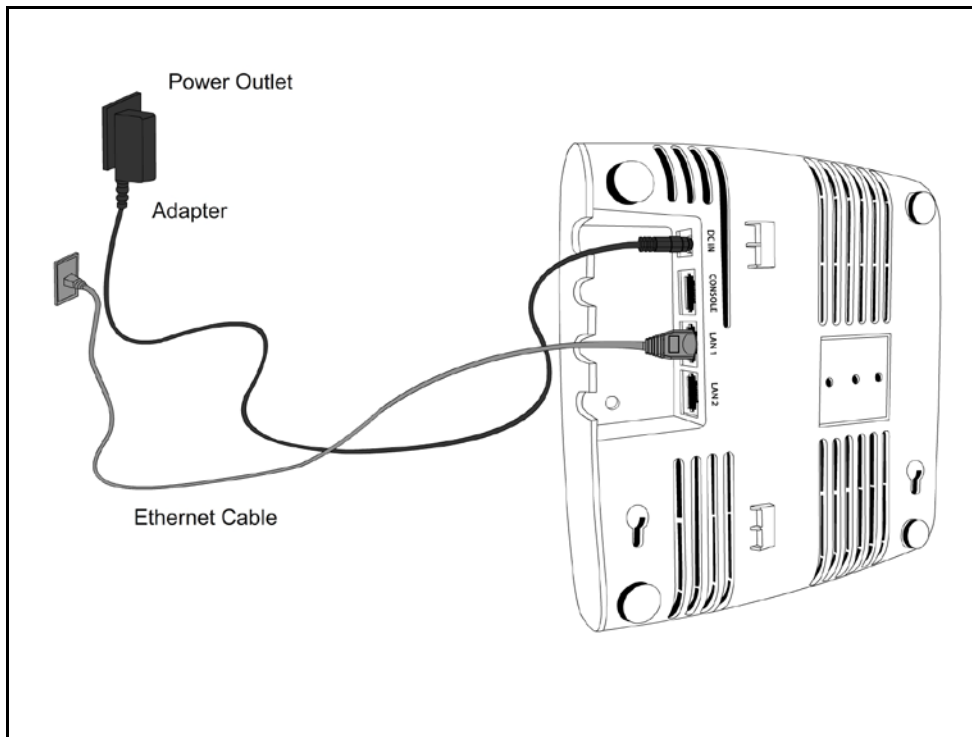
To connect C-65 to the network, perform the following steps:

1. Ensure that a DHCP server is available on the network to provide network configuration to the C-65.

2. Connect one end of the network interface cable to the Ethernet port at the rear of the C-65.
3. Connect the other end of the network interface cable to an Ethernet jack on the desired subnet.

Wait until the device is ready (approx. 10 mins).

Figure 3-5. Connect C-65 to network



4. Check the status LEDs on the device. If all LEDs glow green, then the device is operational and connected to the server.
5. Log on to the server through SSH and run the `get sensor list` command.
You would see a list of all AirTight devices that are recognized by the server. AirTight Cloud Services users can go to the **Devices** tab and check whether the device is visible under the **Devices** tab.

The device is configured and ready to go operational.

Note: If the zero configuration is not successful, the device must be configured manually. Refer to [Manually Configuring C-65](#) for details.

4. Manually Configuring C-65

Important: If the installation in the [previous chapter](#) was successful, stop! You do not need to configure the device manually.

Introduction

Manual configuration of C-65 is typically required in the following cases:

- Devices cannot connect to the server through zero-configuration.
- Device needs to be configured in the ND mode.
- Sensor Only (SO) devices cannot connect to the server through zero-configuration. The DNS entry for the server has been changed to an entry other than **wifi-security-server** or a DNS server is not present in the network. This is applicable for multi-server installations.
- Device is placed on a subnet that is not DHCP enabled.

Configuring AP through Config Shell

The Config Shell supports a pre-defined set of commands used to configure the C-65 device. Log in to the device console using the SSH shell.

The steps to configure the device manually through the SSH shell are as follows:

1. Log in and change the default password
2. Set Server Discovery
3. Configure Network Settings

Log in and Change the Default Password

Log in to the Config Shell using the user name **config** and password **config**. Change the default password using the `passwd` command. You can change the device password using device templates. Refer to *Device Template* section under the *Administration Tab* chapter, in the *Users' Guide* for more details.

Recommended: Although not mandatory, as a best practice we recommend that you change the default password.

Set Server Discovery

The next step is to set the server discovery information. The following are the types of server discovery:

- Server IP based discovery (preferred)
- Service Location Protocol (SLP) based discovery (if wifi-security-server service has been configured)

Use the `set server discovery` command to point the AP device to the correct server.

Figure 4-1 The set server discovery Command

```
Welcome to the Sensor Config Shell.
-----
Type 'help' to list available commands in the Sensor config shell.
[config]$ set server discovery
Sets information used by Sensor to connect to the Server.

Settings for Server discovery
Please wait while we retrieve the settings...
Select Server Discovery Settings:
1. Server ID Discovery
2. Server IP/DNS Discovery
3. SLP Discovery
Select Option [2]: 2
Set: Server ID Discovery = [OFF]
Set: Server IP/DNS Discovery = [ON]
Set: SLP Discovery = [OFF]
Primary Server IP/Hostname [192.168.8.173]:
Set: Primary Server IP/Hostname = [192.168.8.173]
Secondary Server IP/Hostname [192.168.8.173]:
Set: Secondary Server IP/Hostname = [192.168.8.173]
[config]$
```

Note: If IP address/ host name based discovery is being used and more than one server is present on the network, then you must enter the IP address of the appropriate server.

Configure Network Settings

Configure a static IP address in absence of a DHCP server

1. Connect a crossover cable from the computer to the Ethernet port of C-65.
2. Configure the LAN IP address on the computer in the subnet 192.168.1.0/24.
3. SSH to IP address: 192.168.1.245 (factory default)
4. Log in to the CLI of the device using default credentials.
5. Configure server discovery on the device.
6. Configure a static IP address on the device. For example: Untagged VLAN 192.168.2.x/24. After completing this step you will lose the SSH connection.
7. Configure the LAN IP address in the range of 192.168.2.x/24 and again SSH to the address assigned in step 6.
8. Check the configuration settings.
9. Remove the crossover connection to the computer and connect the Ethernet port to the local switch.

Configure IPv6 settings

C-65 is IPv6 capable. Use the `set ipv6 config` command to configure advanced options such as DHCP settings, auto negotiation, and manual configuration.

- Enable auto negotiation to discover IP address automatically.
- Enable DHCP settings to obtain addressing as well as more information, such as the DNS address from DHCP server in the network.
- Enable manual configuration to provide manual IPv6 address as well as IPv6 default gateway.

How to configure Communication Key or Passphrase

To configure the communication key or passphrase kindly refer to [Appendix A: AP-Server Mutual Authentication](#) for further details.

5. C-65 Config Shell Commands

The following tables detail the C-65 config shell commands.

Table 5-1 get Commands

get Commands	
Command	Description
get ap	Displays all the currently visible APs
NEW get channel util	Displays the current channel utilization in %, non-Wi-Fi interference in %, and noise floor values in dBm when device is in AP mode. The radio must have at least one active virtual AP to get the channel utilization statistics. You can choose to fetch the current utilization or to auto-read the channel utilization statistics every 5 seconds. Press Ctrl+C to stop auto-read.
get interface	Displays network interface speed and mode
get ip config (deprecated)	Displays the IP information
get log	Displays the log information as it is created
get log config	Displays the configuration of the logger
get mode	Displays the mode in which the device is currently configured
get rf	Displays if RF monitoring for the device is 'ON' or 'OFF'
get serial num	Displays the board number
get server discovery	Displays the server discovery/setting information
get status	Displays the current running status of all the components
get version	Displays the version and build information of all the components
get vlan config	Displays VLAN configuration. Both static and dynamic information is displayed.
get vlan id	Displays listing of all VLANs which can be detected by ND.
get vlan status	Displays status of VLANs which are configured for monitoring by ND.
get vlan connectivity	Pings the specified VLAN other than the communication VLAN.
get model	Displays the AP model.
get antenna	Displays antenna configuration (internal/ external).
get route	Displays IP routing table entries.
get client logs	Gets client connection logs as it happens.
get wired trace	Performs packet capture on Ethernet interface(eth0) upto file size 5MB.
get ap status	Displays wireless profiles and associated clients.
get presence notification parameters	Displays the value of the presence notification parameters, that is, RSSI value in dbm, time interval in seconds, and IP address or host name of the presence notification server.

Table 5-2. set Commands

set Commands	
Command	Description
set erase	Sets the erase character to ^H.
set interface	Sets network interface properties such as auto negotiation, speed, and duplex settings.
set ip config	Runs through the current VLAN and IP config wizard.
set server discovery	Sets the server discovery information.
set vlan config	Configures list of VLANs and their network settings, to be monitored by ND.
set ipv6 config	Sets IPv6 network settings.
set communication key	Sets the AP-server shared secret. You must enter a hexadecimal value, of length 32, as the shared secret. It can be used instead of the set communication passphrase command. Use this command if you are comfortable working with hexadecimals.
set communication key default	Sets the communication key to its default value.
set communication passphrase	Sets the AP-server shared secret. You must enter a character string, of length between 10 and 127, as the shared secret. The string is internally converted to hexadecimal format. It can be used instead of the set communication key command.
set presence notification parameters	Sets the presence notification parameters. The parameters for presence notification are the RSSI value in dbm, IP address/hostname of the presence notification server and time interval in seconds. The RSSI value can range between -127 and 0 dbm. The time interval can range between 0 and 14400 seconds.

Table 5-3. Miscellaneous commands

Other Commands	
Command	Description
exit	Exits the config shell session
help	Displays help for all commands
help set	Displays help for 'set' commands
help get	Displays help for 'get' commands
help other	Displays help for 'other' commands
passwd	Changes the config shell password
ping <Hostname/IP address>	Pings a host. Usage: ping <IP_address/host_name> For example, ping 192.168.1.246
ping6 <IPv6 address or hostname>	Pings an IPv6 host Usage: ping6 <IPv6_address/host_name>
presence notification enable	Enables the presence notification feature.
presence notification disable	Disables the presence notification feature.
reboot	Reboots the AP
restart	Restarts the AP application
reset factory	Resets the AP to 'out of the box' status
upgrade	Upgrades the AP manually from a given IP address

6. C-65 Troubleshooting

Following are the troubleshooting guidelines for C-65.

Symptoms	Diagnosis	Solution
Wi-Fi: any Ethernet: fast blink Power: solid orange	The device did not receive a valid IP address via the DHCP.	Ensure that the DHCP server is on and available on the VLAN/subnet to which the device is connected. If the device still fails to get a valid IP address, you can reboot it to see if the problem is resolved.
	The Ethernet cable is loose. The device is probably disconnected from the network.	Ensure that the Ethernet cable is connected.
Wi-Fi: any Ethernet: slow blink Power: solid orange	Unable to connect to the server	Ensure that the server is running and is reachable from the network to which the device is attached. If there is a firewall or a router with ACLs enabled between the device and the server, ensure that the traffic is allowed on UDP port 3851. Use the server IP-based discovery and ensure that you have correctly entered the DNS name, wifi-security-server, on the DNS server. Also, ensure that the DNS server IP addresses are either correctly configured on the device, or are provided by the DHCP server. It is also possible that the AP is unable to connect to the server because it has failed to authenticate with the server. In this case, an 'Authentication failed for ' event is raised on the server. Refer to the event for recommended action.

Appendix A: Access Point (AP)-Server Mutual Authentication

The AP-server communication begins with a mutual authentication step in which the AP and server authenticate each other using a shared secret. The AP-server communication takes place only if this authentication succeeds.

After the authentication succeeds, a session key is generated. All communication between the AP and server from this point on is encrypted using the session key.

The AP and server are shipped with the same default value of the shared secret. The CLI commands are provided on both server and AP for changing the shared secret.

Note: After the shared secret (communication key) is changed on the server, all APs connected to the server will automatically be set up to use the new communication key. APs that are not connected to the server at this time must be manually set up with the same communication key to enable communication with this server.

Note: Although the server is backward compatible, that is, older version APs can connect to a newer version server, this is not recommended.
