



**Ruckus Wireless™
ZoneFlex™ 7761CM Dual Band 802.11n
Outdoor Access Point
with Integrated Cable Modem**

Installation Guide

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1 About This Installation Guide

This *Installation Guide* provides information on how to set up the Cable Modem Access Point (CMAP) on your network. Topics covered in this guide include installation, basic configuration, operation, and device mounting.

This guide is intended for use by those responsible for installing and setting up network equipment. Consequently, it assumes a basic working knowledge of local area networking, cable modem setup and configuration, wireless networking, and wireless devices.



NOTE: The cable modem and access point each have its own independent firmware load that are updated independently.

Related Documentation

In addition to this guide, each Cable Modem Access Point documentation set includes the following:

- *User Guide:* Provides detailed information on how to configure the functions of the unit. The User Guide is available for download on the Ruckus Wireless Support Web site at:
`http://support.ruckuswireless.com/documents`
- *Release Notes:* Provides late-breaking information about the current software release, including new features, enhancements, and known issues. If the information in the Release Notes differs from the information in this guide, follow the instructions in the Release Notes.
- *Online Help:* Accessible from the CMAP's Web interface, the Online Help provides information that helps you configure the device from the Web interface.

Using ZoneDirector to Manage the CMAP

If you are planning to use a Ruckus Wireless ZoneDirector to manage the CMAP, this guide describes the required steps that will enable the access point to report to and communicate with ZoneDirector successfully. Refer to "[Configure Option 43 on the DHCP Server \(ZoneDirector Management Only\)](#)" on page 16.

Terms Used in This Guide

Before continuing, Ruckus Wireless recommends that you become familiar with the following terms:

- *Access Point (AP):* The Wi-Fi component of the Cable Modem Access Point (CMAP).

- *Cable Modem (or CM)*: The cable modem component of the Cable Modem Access Point (CMAP).
- *Cable Modem Access Point (or ZF7761CM)*: The whole unit, which includes the CM and AP, as well as the power supply.

2 Unpacking the CMAP

1. Open the CMAP package, and then carefully remove the contents.
2. Return all packing materials to the shipping box, and put the box away in a dry location.
3. Verify that all items listed in [Package Contents](#) below are included in the package. Check each item for damage. If any item is damaged or missing, notify your authorized Ruckus Wireless sales representative.

Package Contents

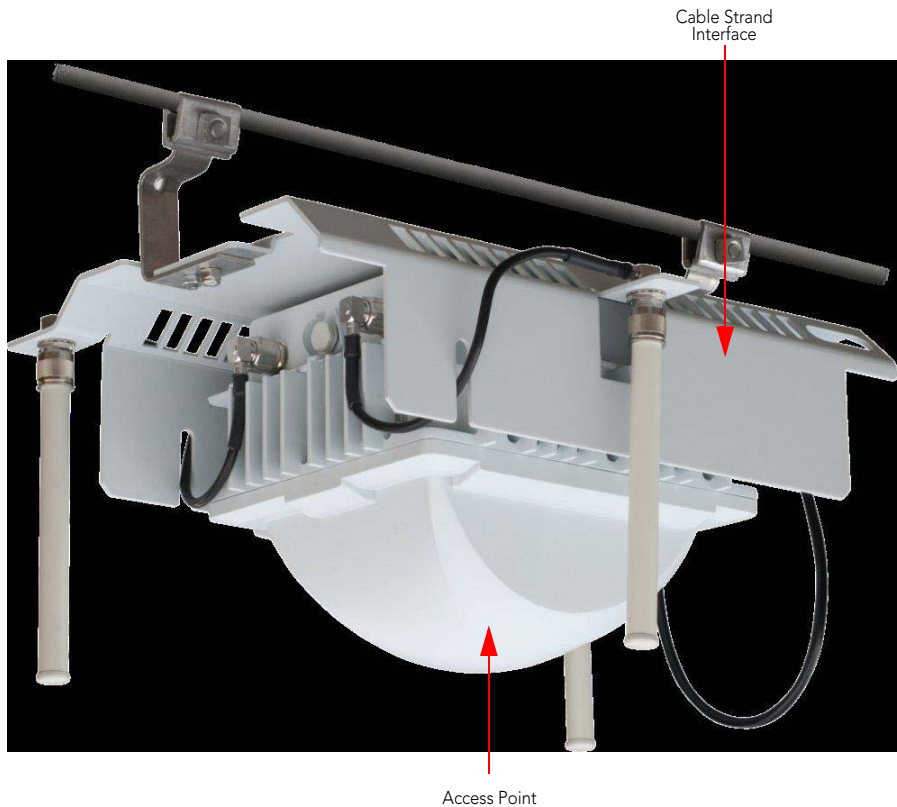
A complete ZoneFlex 7761CM package contains all of the items listed below:

- ZoneFlex 7761CM unit
- Three N-type 5GHz external antennas
- Service Level Agreement / Limited Warranty Statement
- Regulatory Statement
- This *Installation Guide*



NOTE: The CMAP comes preinstalled with the cable strand interface, which you will use to mount the assembly onto the cable strand. You only need to attach the three external antennas to the cable strand interface (after mounting the CMAP on the strand) to complete the assembly. See [“Installing the Antennas”](#) on page 45 for more information.

Figure 1. The CMAP comes preassembled with the cable strand interface



3 Preparing for Installation

This section describes the tasks that you need to perform before proceeding with the installation. The required tasks depend on whether you are deploying the access point as a standalone device or as a ZoneDirector-managed device.

- [Preconfiguring the Access Point \(Standalone Only\)](#)
- [Configure Option 43 on the DHCP Server \(ZoneDirector Management Only\)](#)



NOTE: A standalone access point refers to a device that is not managed by Ruckus Wireless ZoneDirector or Ruckus Wireless FlexMaster.

Preconfiguring the Access Point (Standalone Only)

If you are deploying the access point as a standalone device, Ruckus Wireless strongly recommends that you preconfigure (or “stage”) the unit before mounting it. It is more convenient to connect the administrative computer to the access point and configure the device in the lab than when the device is already mounted on the cable strand.

Preconfiguring the access point requires the following tasks to be completed:

- [Step 1: Prepare the Administrative Computer](#)
- [Step 2: Supply Power to the CMAP](#)
- [Step 3: Log Into the Access Point’s Web Interface](#)
- [Step 4: Configure the Wireless Settings](#)
- [Step 5: Disconnect the CMAP from the Administrative Computer](#)
- [Step 6: Restore the Administrative Computer’s Network Settings](#)

Before starting, prepare the following requirements:

- DC power supply (see *DC Power Supply* in [“Connectors”](#) on page 31)
- One Ethernet cable
- An administrative computer (any computer running Windows that you will use to preconfigure the access point)

Step 1: Prepare the Administrative Computer



NOTE: The following procedures are applicable if the administrative computer is running on Windows XP. If you are using a different operating system, refer to the documentation that was shipped with your operating system for information on how to modify the computer's IP address settings.

On Microsoft Windows 7


1. Click the , and then click **Control Panel**.
2. Double-click **Network and Sharing Center**.
3. On the left menu, click **Change Adapter Settings**. The *Network Connections* page appears and displays the available network interfaces on the computer.
4. Look for the network connection icon labeled **Local Area Connection**.
5. Right-click **Local Area Connection**, and then click **Properties**. The *Local Connection Properties* dialog box appears.
6. Under *This connection uses the following items*, look for **Internet Protocol Version 4 (TCP/IPv4)**, and then double-click the item. The *Internet Protocol Version 4 (TCP/IPv4) Properties* dialog box appears.
7. Write down all of the currently active network settings. You will need this information later when you restore your computer to its current network configuration.
8. On the *General* tab, Click **Use the following IP address**, and then configure the IP address settings with the values listed in [Table 2](#). For a sample configuration, refer to [Figure 3](#).

Table 1. Configure your computer's IP address settings

IP address	192 . 168 . 100 . 77 (or any address in the 192.168.100.x network — with the exception of 192 . 168 . 100 . 2, which is already used by the access point)
Subnet mask	255 . 255 . 255 . 0

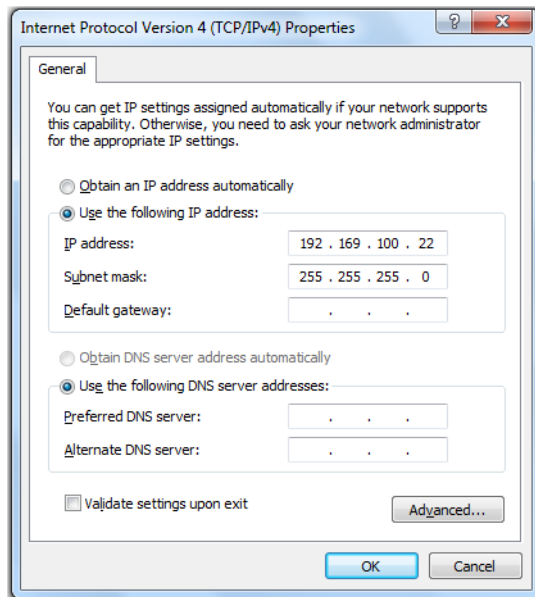
9. Click **OK** to save your changes and close the *Internet Protocol Version 4 (TCP/IPv4) Properties* dialog box.
10. Click **OK** again to close the *Local Area Connection Properties* dialog box.

Windows saves the IP address settings that you configured.

Preparing for Installation

Preconfiguring the Access Point (Standalone Only)

Figure 2. Sample configuration in the Internet Protocol Version 4 (TCP/IPv4) Properties dialog box



On Microsoft Windows XP

1. Click **Start > Control Panel > Network Connections**.
2. When the Network Connections window appears, right-click the icon for Local Area Connection, and then click **Properties**.



NOTE: Make sure that you configure the Local Area Connection properties, not the Wireless Network Connection properties.

3. When the *Local Area Connection Properties* dialog box appears, select **Internet Protocol (TCP/IP)** from the list, and then click **Properties**. The *Internet Protocol (TCP/IP) Properties* dialog box appears.
4. Write down all of the currently active network settings. You will need this information later when you restore your computer to its current network configuration.

5. Click **Use the following IP address**, and then configure the IP address settings with the values listed in [Table 2](#). For a sample configuration, refer to [Figure 3](#).

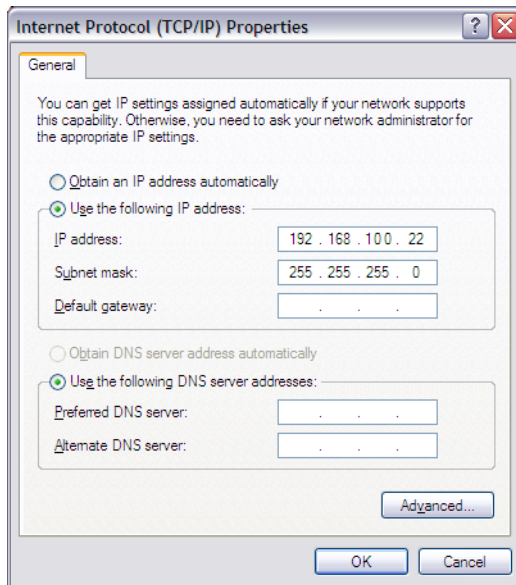
Table 2. Configure your computer's IP address settings

IP address	192 . 168 . 100 . 77 (or any address in the 192.168.100.x network — with the exception of 192 . 168 . 100 . 2, which is already used by the access point)
Subnet mask	255 . 255 . 255 . 0

6. Click **OK** to save your changes and close the *Internet Protocol (TCP/IP) Properties* dialog box.
7. Click **OK** again to close the *Local Area Connection Properties* dialog box.

Windows saves the IP address settings that you configured.

Figure 3. Sample configuration in the *Internet Protocol (TCP/IP) Properties* dialog box



Step 2: Supply Power to the CMAP

In this step, you will connect the CMAP to the administrative computer, and then you will power it on using 12 VDC power.



NOTE: Before starting this procedure, you must have already obtained a DC power supply, such as 705-60224-002 shown in [Figure 4](#).

To supply DC power to the CMAP

1. Connect one end of an Ethernet cable to the Ethernet port (labeled **PoE OUT**) on the CMAP, and then connect the other end to the administrative computer's Ethernet port.
2. Remove the protective cap from the DC connector on the CMAP.
3. Connect the DC adapter (labeled 2 in [Figure 4](#)) to the DC connector on the CMAP.

Figure 4. DC switching adapter



[Table 3](#) identifies the numbered components in [Figure 4](#).

Table 3. DC switching adapter components

Number	Description
1	Power Supply: 100 to 240VAC input. Connects with a standard IEC C13 style power cord.

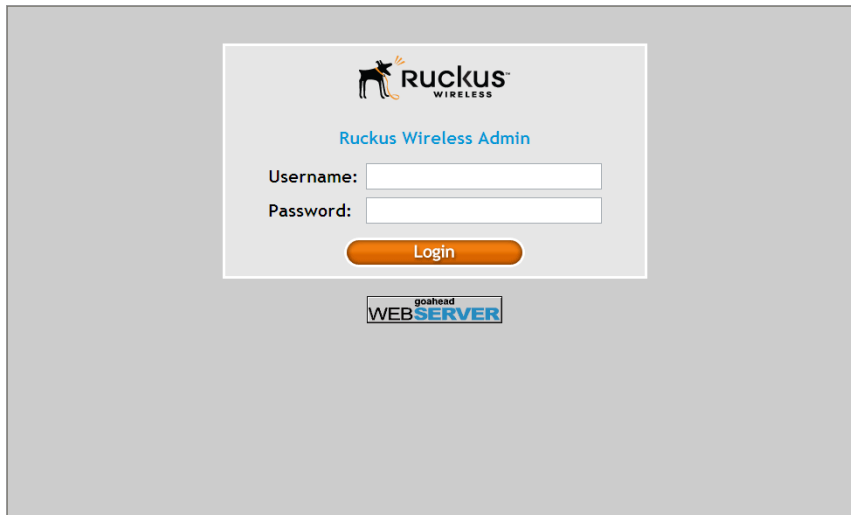
Table 3. DC switching adapter components

Number	Description
2	Connector for the 12VDC connector on the CMAP
3	Reset switch

Step 3: Log Into the Access Point's Web Interface

1. On the administrative computer, open a Web browser window.
2. In the address or location bar, type the following address:
`https://192.168.100.2`
3. Press <Enter> on the keyboard to connect to the access point's Web interface. A security alert message appears.
4. Click **Yes** or **OK** (depending on the browser) to continue. The access point's login page appears.

Figure 5. The ZoneFlex Access Point login page



5. In **User name**, type `super`.
6. In **Password**, type `sp-admin`.
7. Click **Log In**. The Web interface appears, displaying the Device page.
8. Continue to ["Step 4: Configure the Wireless Settings"](#) below.

Step 4: Configure the Wireless Settings

To complete this step, you will need to configure the settings on the **Common** tab and at least one **Wireless #** tab. These are the essential wireless settings that will enable wireless devices on the network to associate with the access point.



NOTE: ZoneFlex 7762 has one 2.4GHz radio and one 5GHz radio. The wireless settings for each radio need to be configured separately on the Web interface (except for the country code setting, see note in [Table 4](#)). To configure the 2.4GHz radio settings, click **Configuration > Radio 2.4G**. To configure the 5GHz radio settings, click **Configuration > Radio 5G**.

For your reference, the default wireless settings on the access point are listed in [Table 4](#).

Table 4. Default wireless settings

Setting	Default Value
SSID (network name)	Wireless 1 to Wireless 8 (8 WLANs)
Encryption (security)	Disabled on all WLANs
Default management IP address	192 . 168 . 100 . 2

Configure Common Wireless Settings

1. On the left menu of the Web interface, click **Configuration > Radio {2.5/5} G**. The Common page appears.
2. Verify that the common wireless settings are configured as listed in [Table 8](#).

Table 5. Common wireless configuration

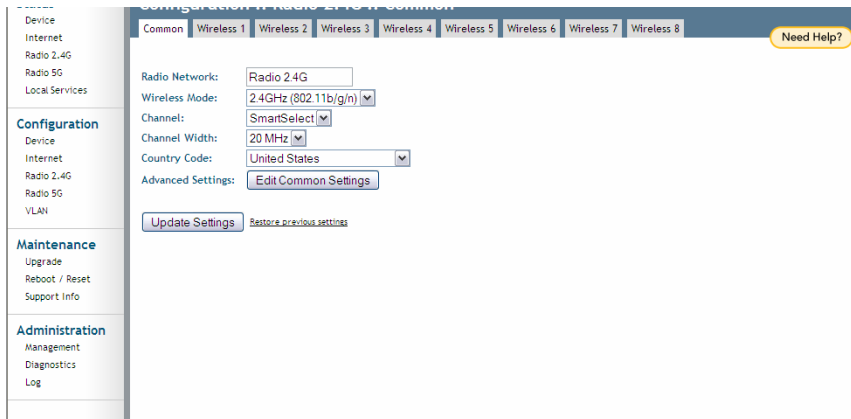
Setting	Recommended Value
Wireless Mode	Auto-select
Channel	SmartSelect
Channel Width	20MHz or 40MHz

Table 5. Common wireless configuration

Setting	Recommended Value
Country Code	<ul style="list-style-type: none">• If you purchased the access point in the United States, this value is fixed to United States at the factory and is not user-configurable.• If you purchased the access point outside of the United States, verify that the value is set to your country or region. Selecting the correct country code ensures that the access point uses only the radio channels allowed in your country or region. <p><i>NOTE: The two radios on ZoneFlex 7762 Access Point are always configured with the same country code setting. If you change the country code for Radio 2.4G, for example, the same change will be automatically applied to Radio 5G.</i></p>

3. If you made any changes to the **Common** tab that you want to save, click **Update Settings**.
4. Continue to ["Step 4: Configure the Wireless Settings"](#) below.

Figure 6. The Configuration > Radio 2.4 > Common tab



Configure Wireless # Settings

1. Click one of the **Wireless #** tabs.
2. In **Wireless Availability**, click **Enabled**.
3. In **Broadcast SSID**, click **Enabled**.

Preparing for Installation

Preconfiguring the Access Point (Standalone Only)

4. Clear the **SSID** box, and then type a unique and descriptive name that you want to call this wireless network.

For example, you can type `Ruckus Wireless AP`. This SSID is the name that will help users identify this wireless network in their wireless network connection application.



NOTE: You may also configure other wireless settings on this and other **Wireless #** tabs (in addition to the settings described above), although it is not necessary for completing the access point installation.

5. Click **Update Settings**.

You have completed configuring the basic wireless settings of the access point.

Figure 7. The Configuration > Radio 2.4 > Wireless 1 tab

The screenshot shows a web-based configuration interface. On the left is a navigation menu with sections: Configuration (Device, Internet, Radio 2.4G, Radio 5G, VLAN), Maintenance (Upgrade, Reboot / Reset, Support info), and Administration (Management, Diagnostics, Log). The main area has tabs for Common, Wireless 1 (selected), Wireless 2, Wireless 3, Wireless 4, Wireless 5, Wireless 6, Wireless 7, and Wireless 8. A 'Need Help?' button is in the top right. The 'Wireless 1' settings include: Wireless Network (text box with 'Wireless 1'), Wireless Availability? (radio buttons for Enabled and Disabled, with Disabled selected), Broadcast SSID? (radio buttons for Enabled and Disabled, with Enabled selected), SSID (text box with 'Wireless1'), Threshold Settings (Edit Settings button), Rate Limiting (Edit Settings button), Access Control (Edit Settings button), Encryption Method (dropdown menu with 'Disabled' selected), and an Update Settings button with a 'Restore previous settings' link.

Figure 8. Type the FlexMaster server URL

The screenshot displays the configuration page for a device, with a sidebar on the left containing menu items: Device, Internet, Radio 2.4G, Radio 5G, Local Services, Configuration, Maintenance, and Administration. The main content area is titled 'TR069 / SNMP Management Choice' and includes the following fields and options:

- HTTP Port: 80
- HTTPS access?: Enabled Disabled
- HTTPS Port: 443
- RSA key fingerprint: e7:27:ce:7e:24:0a:27:3f:a1:a0:4a:7b:ee:b8:72:3c
- Certificate verification: PASSED
- Auto-provisioning?: Enabled Disabled
- TR069 / SNMP Management Choice: Auto, SNMP only, FlexMaster Only, None
- DHCP Discovery: (checkbox)
- FlexMaster Server URL: (highlighted with a red box)
- Digest-authentication Username: (highlighted with a red box)
- Digest-authentication Password:
- Periodic FlexMaster Inform Interval: 15 minutes (dropdown menu)
- TR069 Status: (text area)

Step 5: Disconnect the CMAP from the Administrative Computer

1. Disconnect the CMAP from the DC power source.
2. Verify that all LEDs are off.
3. Disconnect the Ethernet cable from the administrative computer's Ethernet port.

Step 6: Restore the Administrative Computer's Network Settings

1. On your Windows XP or Windows 2000 computer, open the **Network Connections** (or **Network and Dial-up Connections**) control panel according to how the Start menu is set up:
 - On Windows XP, click **Start > Control Panel > Network Connections**.
 - On Windows 2000, click **Start > Settings > Network Connections**.
2. When the Network Connections window appears, right-click the icon for **Local Area Connection**, and then click **Properties**.
3. When the **Local Area Connection Properties** dialog box appears, select **Internet Protocol (TCP/IP)** from the scrolling list, and then click **Properties**. The **TCP/IP Properties** dialog box appears.
4. Restore the computer's network settings by typing the original IP address settings in the **TCP/IP Properties** dialog box.
5. On the **TCP/IP Properties** dialog box, click **OK** to close it.
6. Click **OK** again to close the **Local Area Connection Properties** dialog box.

You are now ready to connect the CMAP to your network.

Pointing the CMAP to ZoneDirector

If you are deploying the access point to be managed by ZoneDirector, you must ensure that the CMAP can report to its parent ZoneDirector device on the network. There are two ways you can do this:

- [Use SSH to Set the ZoneDirector IP Address on the CMAP](#)
- [Configure Option 43 on the DHCP Server \(ZoneDirector Management Only\)](#)

Use SSH to Set the ZoneDirector IP Address on the CMAP

You can use SSH to set the IP address of the ZoneDirector device that you want to use to manage the CMAP. Before starting this procedure, you must obtain the IP address of the ZoneDirector device to which you want to assign the CMAP.

To perform this procedure, you will need the following:

- An administrative computer
- An Ethernet cable
- A Telnet or SSH (secure shell) client program

To set the ZoneDirector IP Address on the CMAP via SSH

1. Connect one end of the Ethernet cable to the administrative computer's Ethernet port, and then connect the other end to the CMAP's Ethernet port.
2. Change the administrative computer's IP address to the same subnet as the CMAP. The AP's default IP address is 192.168.100.2.
3. Start the Telnet or SSH client program on the administrative computer.
4. Log onto to the AP via Telnet or SSH using the following logon details:

- User name: **super**
- Password: **sp-admin**

5. When command prompt appears, enter the following command:

```
set director ip {ip-address}
```

where {ip-address} is the IP address of the ZoneDirector to which you want to assign the CMAP.

The following message appears, which indicates that you have assigned the ZoneDirector IP address:

```
Please reboot for this change to take effect.
```

6. Reboot the CMAP.
7. Log onto the command prompt again, and then enter the following command:

```
get director info
```

The command prompt displays the IP address of the ZoneDirector device that is managing the CMAP.

8. Verify that this IP address is the same IP address that you set in [Step 5](#).

You have completed the setting the ZoneDirector IP address via SSH.

Configure Option 43 on the DHCP Server (ZoneDirector Management Only)

You can configure the DHCP server on your CMTS backbone to ensure that the CMAP will successfully discover its parent ZoneDirector on the network.

To customize your DHCP server, you need to configure DHCP Option 43 (043 Vendor Specific Info) with the IP address of the ZoneDirector device on the network. When an access point requests an IP address, the DHCP server will send a list of ZoneDirector IP addresses to the access point. If there are multiple ZoneDirector devices on the network, the access point will automatically select a ZoneDirector to register with from this list of IP addresses.



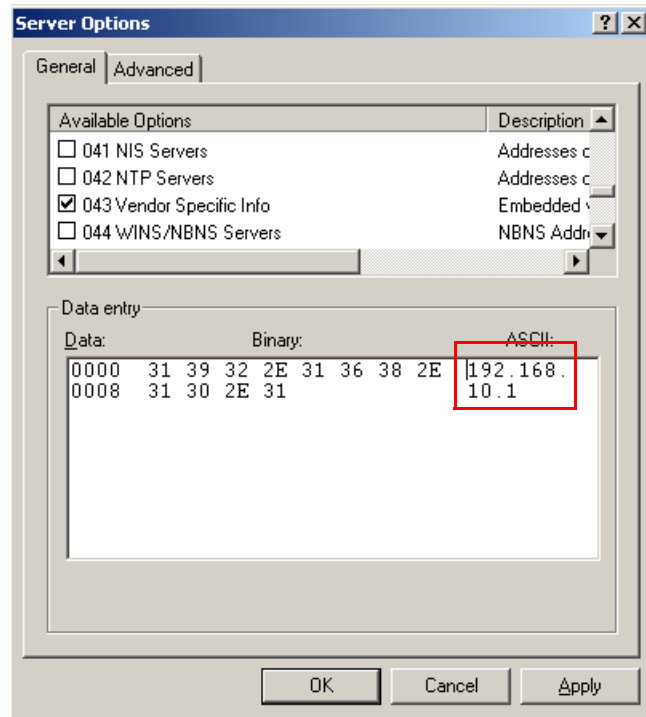
NOTE: The following procedure describes how to customize a DHCP server running on Microsoft Windows. If your DHCP server is running on a different operating system, the procedure may be different.

The procedure for configuring Option 43 on your DHCP server depends on whether both ZoneDirector and FlexMaster exist on the network, and whether you want to add the DHCP subcode for ZoneDirector.

If Only ZoneDirector Exists on the Network (No ZoneDirector Subcode)

1. From *Control Panel > Windows Administrative Tools*, open **DHCP**, and then select the DHCP server you want to configure.
2. If the **Scope** folder is collapsed, click the plus (+) sign to expand it.
3. Right-click **Scope Options**, and then click **Configure Options**. The *General* tab of the Scope Options dialog box appears.
4. Under *Available Options*, look for the **43 Vendor Specific Info** check box, and then select it.
5. Under *Data Entry*, position the cursor in the ASCII text area, and then type the IP address of the ZoneDirector device. In the figure below, the IP address of the ZoneDirector device is 192 . 168 . 100 . 2.

Figure 9. In the ASCII area, type the IP address of the ZoneDirector device



The hexadecimal equivalent of the ZoneDirector IP address appears in the Binary text area.



NOTE: If there are multiple ZoneDirector devices on the network, type all the IP addresses in the ASCII text area. Use commas (,) to separate the IP addresses. If a management interface is used for Web UI management, the actual IP address must still be used when configuring ZoneDirector as a client for a backend RADIUS server, FlexMaster server or in any SNMP systems. If two ZoneDirector devices are deployed in a Smart Redundancy configuration, both of the actual IP addresses must be used rather than the management IP address.

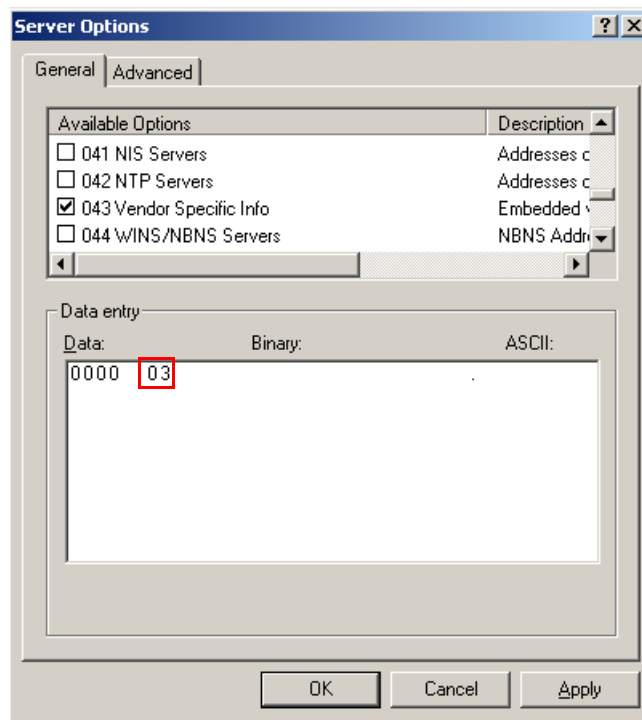
6. Click **Apply** to save your changes.
7. Click **OK** to close the Scope Options dialog box.

You have completed customizing your DHCP server to automatically provide supported APs with ZoneDirector's IP address.

If Only ZoneDirector Exists on the Network (With ZoneDirector Subcode)

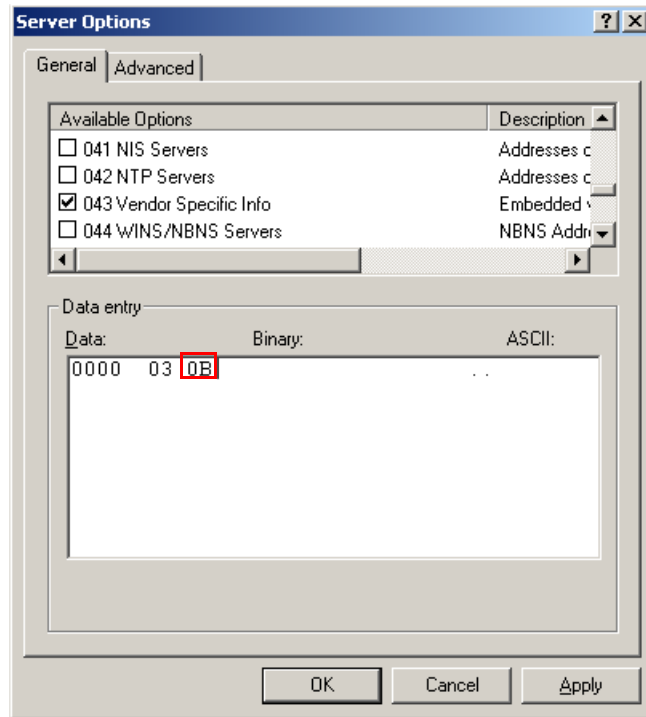
1. From Control Panel > Windows Administrative Tools, open **DHCP**, and then select the DHCP server you want to configure.
2. If the **Scope** folder is collapsed, click the plus (+) sign to expand it.
3. Right-click **Scope Options**, and then click **Configure Options**. The General tab of the Scope Options dialog box appears.
4. Under **Available Options**, look for the **43 Vendor Specific Info** check box, and then select it.
5. Under **Data Entry**, highlight the existing values, and then press <Delete> on your keyboard.
6. Position your cursor again after the last octet (in this example, 0000) under the **Binary** text area, and then type 03 (the subcode for ZoneDirector).

Figure 10. Under the Binary text area, type 03 (the subcode for ZoneDirector)



7. After the ZoneDirector subcode (03), type the hexadecimal equivalent of the length of the ZoneDirector IP address. For example, if the ZoneDirector IP address is 192.168.10.1, the length in decimal is 12 and the hexadecimal equivalent is 0B.

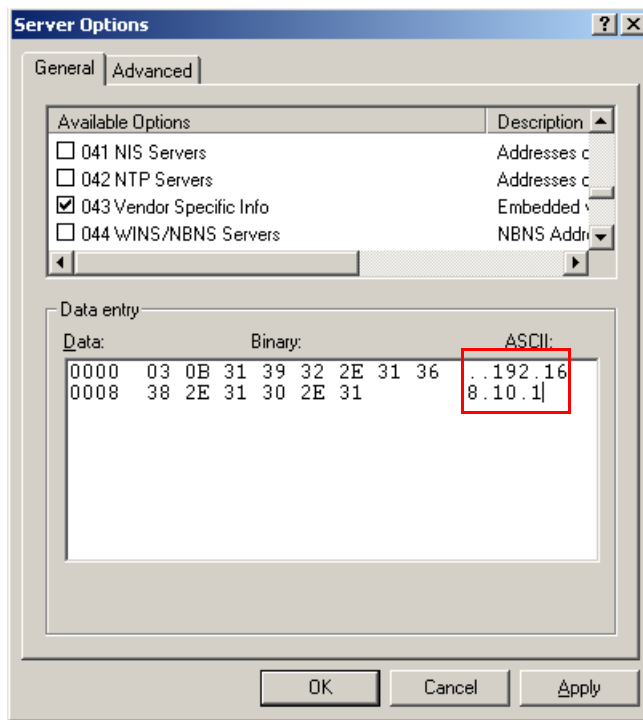
Figure 11. After the ZoneDirector subcode, type the hexadecimal equivalent of the ZoneDirector IP address length



8. Position the cursor under the ASCII text area, and then type the ZoneDirector IP address. If you typed the hexadecimal equivalent of the ZoneDirector IP address, there should be two bytes (represented by two periods) already filled under the ASCII text area.

In the example below, the ZoneDirector IP address is 192.168.10.1.

Figure 12. In the ASCII text area, type the ZoneDirector IP address



9. Click **Apply** to save your changes.

10. Click **OK** to close the Scope Options dialog box.

You have completed configuring DHCP Option 43 to provide supported APs with the ZoneDirector IP address.

If Both ZoneDirector and FlexMaster Exist on the Network

Before starting with this procedure, count the number of characters (including `http` or `https`, back slashes, colon, and periods) in the FlexMaster server URL and ZoneDirector IP address, and then convert these (decimal) values to hexadecimal. If there are multiple ZoneDirector devices on the network, count the total number of characters.

You will need this information when you configure DHCP Option 43 for both FlexMaster and ZoneDirector. You can use an online conversion Web site, such as <http://www.easycalculation.com/decimal-converter.php>, to perform the conversion.

The table below lists the FlexMaster URL and ZoneDirector IP address that are used as examples in this procedure, including their length in decimal and hexadecimal values.

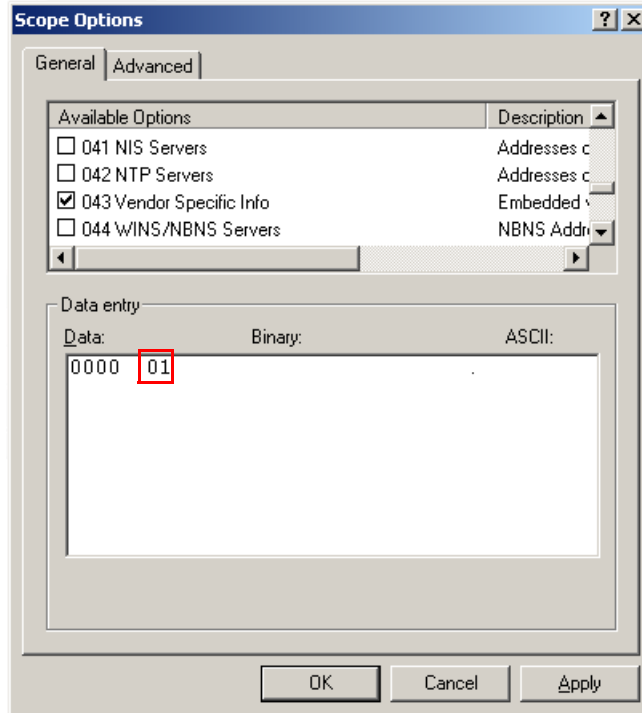
Table 6. URL/IP address values that are used as examples in this procedure

	URL / IP Address	Decimal Length	Hexadecimal Length
FlexMaster	http://192.168.10.1/intune/ server (URL)	33	21
ZoneDirector	192.168.10.2 (IP Address)	12	0C

Do the following on the DHCP server

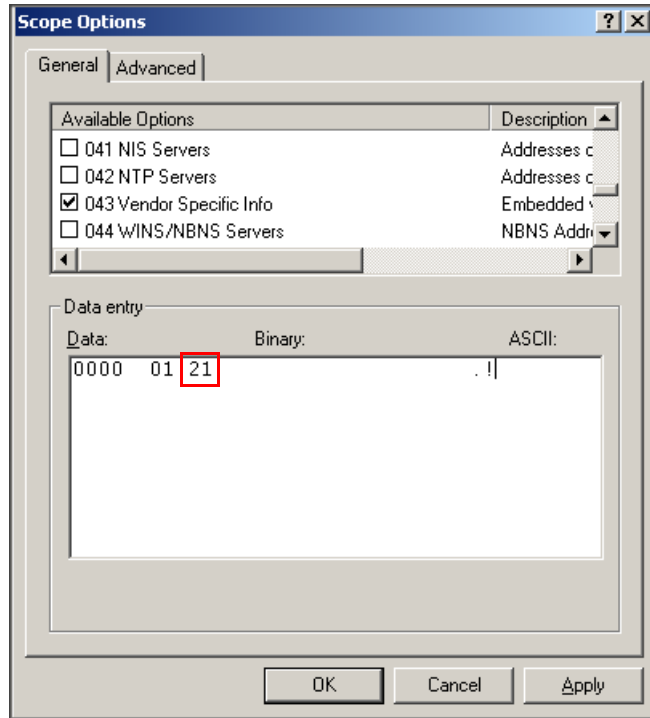
1. From Windows Administrative Tools, open **DHCP**, and then select the DHCP server you want to configure.
2. If the **Scope** folder is collapsed, click the plus (+) sign to expand it.
3. Right-click **Scope Options**, and then click **Configure Options**. The General tab of the Scope Options dialog box appears.
4. Under **Available Options**, look for the **43 Vendor Specific Info** check box, and then select it.
5. Under **Data Entry**, highlight the existing values, and then press **<Delete>** on your keyboard.
6. Position the cursor in the **Binary** text area, and then type 01, the subcode for FlexMaster.

Figure 13. Type 01, the subcode for FlexMaster



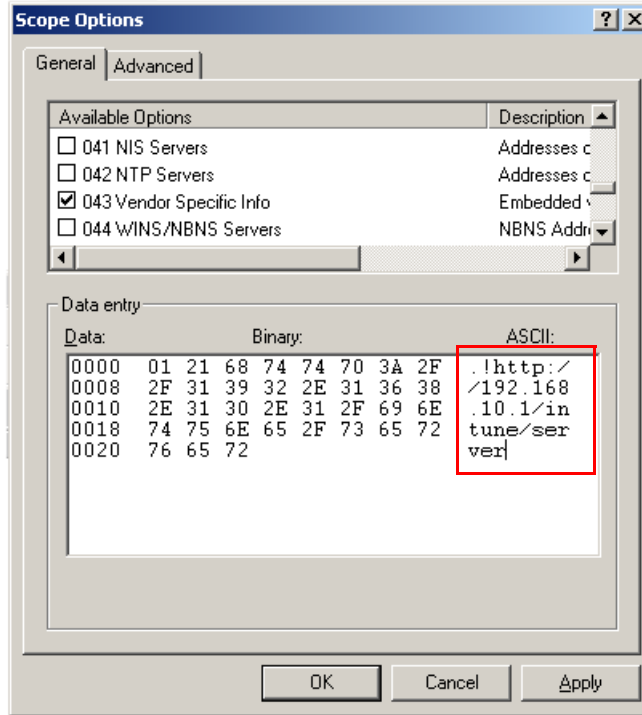
7. Under the **Binary** text area, position the cursor after the 01 subcode, and then type 21 – the hexadecimal equivalent of the FlexMaster server URL length that is used as the example in this procedure.

Figure 14. After the 01 subcode for FlexMaster, type 21 – the hexadecimal equivalent of the FlexMaster server URL length



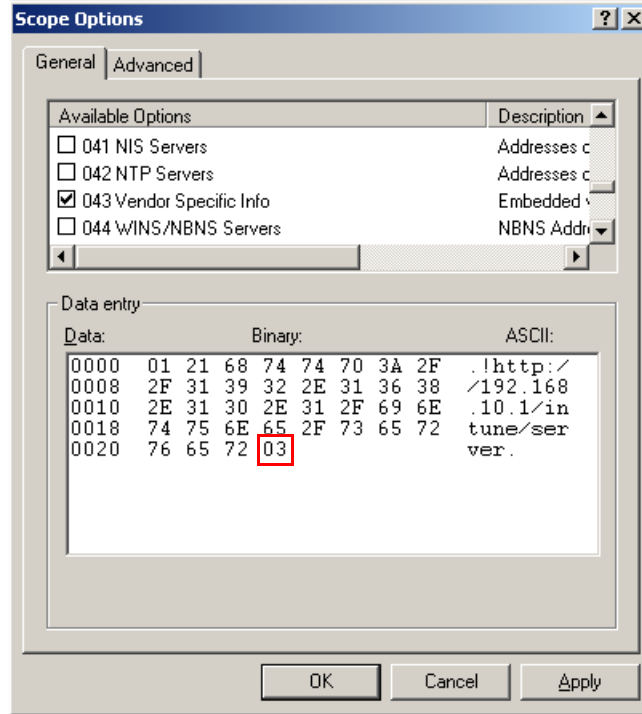
8. Position the cursor under the ASCII text area, and then type the FlexMaster server URL. In the example below, the FlexMaster server URL is <http://192.168.10.1/intune/server>.

Figure 15. In the ASCII text area, type the FlexMaster server URL



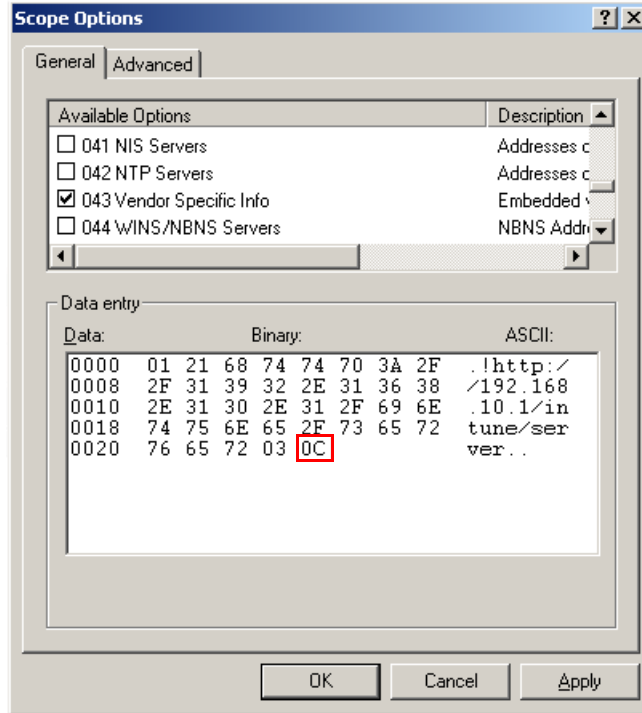
9. Position your cursor again after the last octet (in this example, 72) under the **Binary** text area, and then type 03 (the subcode for ZoneDirector).

Figure 16. Under the Binary text area, type 03 (the subcode for ZoneDirector)



10. After the ZoneDirector subcode (03), type the hexadecimal equivalent of the length of the ZoneDirector IP address length. For example, if the ZoneDirector IP address is 192.168.10.2, the length in decimal is 12 and the hexadecimal equivalent is 0C.

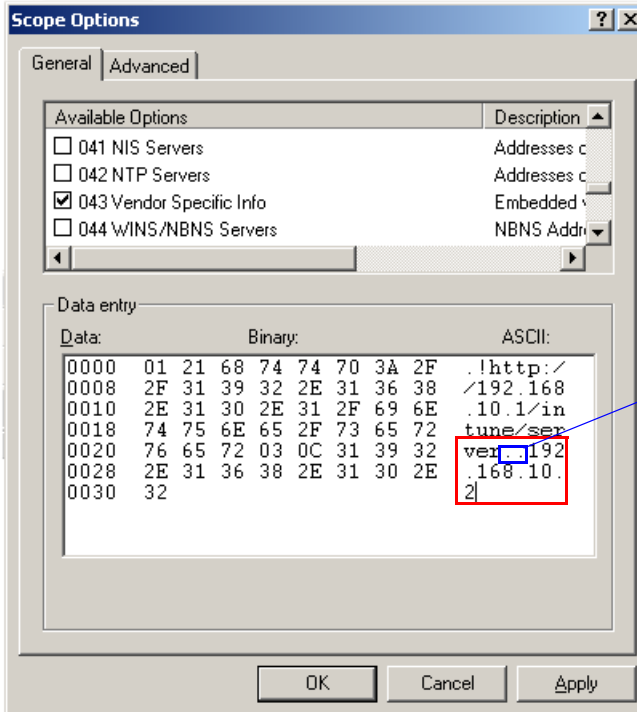
Figure 17. After the ZoneDirector subcode, type the hexadecimal equivalent of the ZoneDirector IP address length



11. Position the cursor under the ASCII text area after the FlexMaster server URL, and then type the ZoneDirector IP address. If you typed the hexadecimal equivalent of the ZoneDirector IP address, there should be two bytes (represented by two periods) between the FlexMaster URL and the ZoneDirector IP address.

In the example below, the ZoneDirector IP address is 192.168.10.2.

Figure 18. In the ASCII text area, type the ZoneDirector IP address (two bytes after the FlexMaster server URL)



There should be a two-byte gap between the FlexMaster URL and ZoneDirector IP address

12. Click **Apply** to save your changes.

13. Click **OK** to close the Scope Options dialog box.

You have completed configuring DHCP Option 43 to provide supported APs with the FlexMaster server URL and ZoneDirector IP address.

4 Hardware Features

[Figure 19](#) and [Figure 20](#) identify the CMAP features that are relevant to the installation and mounting instructions that this guide provides. Before you begin the installation process, Ruckus Wireless recommends that you first become familiar with these features.

Figure 19. CMAP parts and connectors (Connector side)

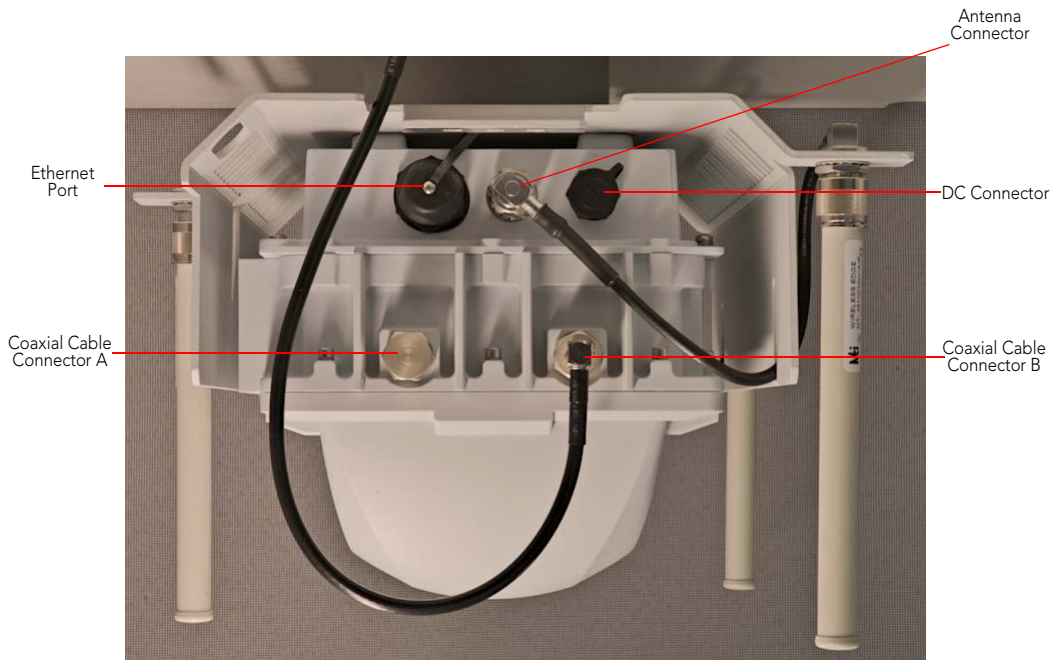


Table 7. Parts and connectors on the CMAP

Label	Description
Ethernet Port	RJ45 port that supports 10/100Mbps connections and provides Power over Ethernet (PoE) power to compliant devices.
Antenna Connector	One of the three connectors for the three 5GHz antennas supplied with the CMAP. The other two connectors are located on the other side of the unit (see Figure 20).
DC Connector	In addition to the power supplied by the coaxial cable from the CMTS, the CMAP may also be DC powered. Shorting pins 3 and 4 in the DC power connector using an electrical shunt will reset the CMAP to factory default settings. For more information, refer to "Troubleshooting" on page 46.
Coaxial Cable Connector A	Provides a 9 dB lower sample of the downstream RF signal as seen by the modem electronics. Therefore, the CATV tap should be selected to provide a measured downstream signal level on this port, which is approximately 12 to 20 dBmV in the channel being used.
Coaxial Cable Connector B	Connects to the cable modem termination system (CMTS) at the headend using a tap on the plant and it provides AC power to the CMAP. AC power is supplied via Power Over Cable (POC). For more information, see "Using Power Over Cable (Actual Deployment)" on page 35.

Figure 20. CMAP parts and connectors (LED side)

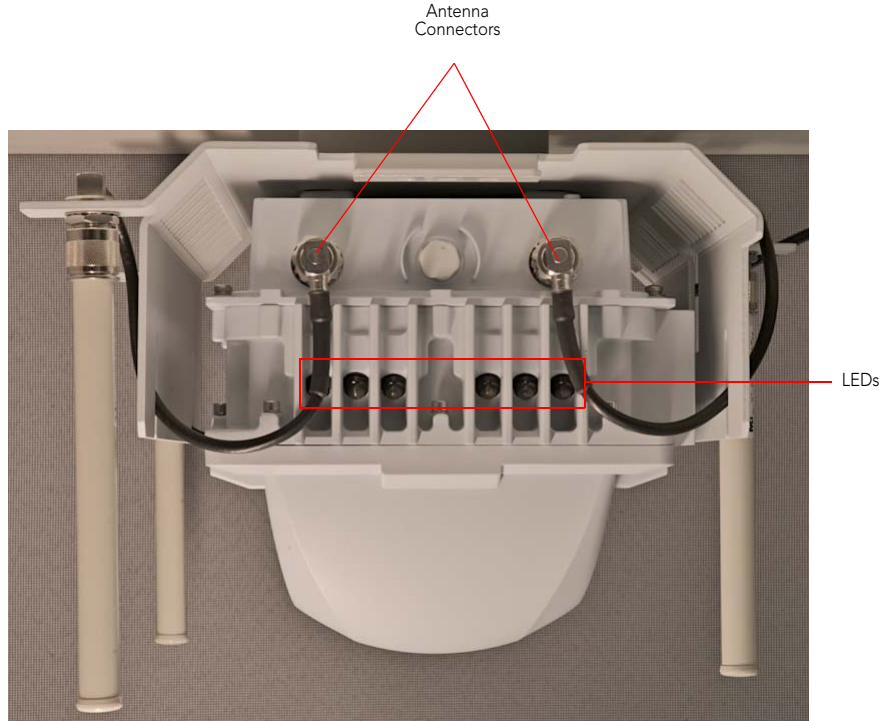


Table 8. LEDs and connectors on the CMAP

Label	Description
Antenna Connectors	Two of the three connectors for the 5GHz antennas. The other connector is located on the other side of the unit (see Figure 19).
LEDs	Six LEDs that indicate the different statuses of the CMAP and cable modem. For more information, refer to “LEDs” on page 31.

Weight and Dimensions

The CMAP has the following weight and dimensions:

- *Unit weight:* 14 pounds (6 Kg)
- *Unit size:* 33 x 42 x 21cm (plus the hangers, which add approximately 8 cm more to the height)
- *Shipping weight:* 17 pounds (8 Kg)
- *Shipping size:* 39 x 41 x 52 cm

Connectors

The CMAP provides the following connectors:

- PoE-Out connector: RJ-45 port that can supply power to devices that support PoE.
- Three N-type antenna connectors: Connects to the three 5GHz antennas supplied with the CMAP.
- DC power supply (Ruckus Wireless part number 705-60244-002): Connected through a 4-pin connector, which is normally unused. It may be used to supply DC power to the unit for testing or configuration purposes. The supply has a reset switch that may be used to reset the unit. See [“Using the Reset Switch on the DC Power Supply”](#) on page 40 for more information.
- Coaxial cable connectors (see [Figure 19](#)): Connector A may be connected to a spectrum analyzer or signal analyzer to allow monitoring of the downstream signal. Connector B must be connected to the CMTS backbone and AC power when deployed in the field.

Ethernet/PoE-Out Port

The CMAP provides one 10/100Mbps RJ45 Ethernet port, which also functions as a PoE-Out port. The PoE-Out port, which can supply up to 15.4 watts (compliant with 802.3af), can be used to power PoE-capable devices (for example, an IP-based surveillance camera).



NOTE: The PoE-Out function is non-operational when the unit is powered via the 12VDC connector.



NOTE: By default, both Ethernet data and PoE-Out are enabled. If necessary, you can disable PoE-Out from the Web interface. Refer to the AP User Guide for more information.

LEDs

Use the six LEDs to check the status of the access point and cable modem. The LEDs behave differently when the access point is in standalone mode and when ZoneDirector is managing it.

Upon bootup, the LEDs are in *CM Mode*. Once bootup is completed, the LEDs alternate between *CM Mode* and *AP Mode*.



NOTE: The LEDs do not indicate whether the access point is in standalone mode or if ZoneDirector is managing it. To check if ZoneDirector is managing the access point, log into the ZoneDirector Web interface, go to the *Access Points* page, and then search for

the access point's MAC address. If you are unable to find the access point, then it is very likely to be in standalone mode. If you have multiple ZoneDirector devices on the network, make sure you check each one of them.

[Table 9](#) describes the behavior of the LEDs on the CMAP when it is in CM, AP standalone, and AP ZoneDirector modes.

Table 9. LED behavior in CM, AP Standalone, and AP ZoneDirector modes

	CM Mode	AP Standalone Mode	AP ZoneDirector Mode
White	On	Off	Off
Orange	Off	On	On
Red	DownStream	At least one 2.4GHz wireless client is associated with the access point and signal strength is strong.	At least one 2.4GHz wireless client is associated with the access point and signal strength is strong.
Red Flashing	Searching for downstream	2.4GHz WLAN is up but no clients.	2.4GHz WLAN is up but no clients.
Yellow	UpStream	At least one 2.4GHz wireless client is associated with the access point and signal strength is weak.	At least one 2.4GHz wireless client is associated with the access point and signal strength is weak.
Green	On_Line	At least one 5GHz wireless client is associated with the access point and signal strength is strong.	If AP is RAP, at least on MAP is associated. If AP is MAP it is associated with a RAP. Signal strength is strong.
Blue	Link	At least one 5GHz wireless client is associated with the access point and signal strength is weak.	If AP is RAP, at least on MAP is associated. If AP is MAP it is associated with a RAP. Signal strength is weak.

Supported Power Sources

The CMAP supports the following power sources:

- Power over Cable (POC): 40 to 90V AC supplied through the RF coaxial cable (attached to Connector B) that is connected to the cable modem termination system (CMTS) backbone. POC is the primary and conventional source of power for the CMAP.
- DC power (via DC connector): External 12 VDC. Use this only when staging or debugging the CMAP.



NOTE: PoE output is disabled when the CMAP is powered via the 12 VDC connector.

Heaters

The CMAP includes two built-in heaters that permit operation at extremely low temperatures. They are typically on below 0 degrees C.

The heaters are enabled by default. If preferred, the access point heater can be disabled from the Web interface. The cable modem heater cannot be disabled.

5 Before You Begin

Before installing and setting up the CMAP, Ruckus Wireless recommends that you first complete the following pre-installation tasks.

Prepare the Required Hardware and Tools

You must supply the following tools and equipment:

- A notebook computer running Windows 7/Vista/XP with one wireless 802.11b/g/n network card and one Ethernet card installed
- Coaxial cable with a male F connector (connected to the CMTS backbone)
- If you plan to use DC to power the CMAP (for staging or debugging purposes only), you will need a DC power supply (see *DC Power Supply* in [“Connectors”](#) on page 31).



NOTE: At the beginning of each procedure, this guide lists the specific tools, accessories, and equipment that you will need to complete the procedure.

Perform a Site Survey

Before installing the CMAP, perform a site survey to determine the optimal access point placement for maximum range, coverage, and network performance. When performing a site survey, consider the following factors:

- *Data rates:* Range is generally inversely proportional to data rates. The maximum radio range is achieved at the lowest workable data rate. Higher data rates will generally be achieved at closer distances.
- *Physical environment:* Clear or open areas provide better radio range than crowded or filled areas. The less cluttered the operating environment, the greater the wireless range.
- *Obstructions, building materials, and sources of interference:* Physical obstructions, such as concrete pillars, steel beams, filing cabinets, buildings, or trees, can block or hinder wireless communication. Avoid installing the CMAP in an environment where there is an obstruction between sending and receiving devices. A number of machines and electronic devices that emit radio waves – wireless phones, microwave ovens, satellite dishes – interfere with and block wireless signals. Building materials used in construction also influence radio signal penetration. For example, drywall construction permits greater range than concrete blocks.
- *Mounting:* The CMAP is designed to hang on a 1/4 to 3/8" support wire. The hangers will allow a 2" bundle of cables between the support wire and the CMAP.
- *Power and backhaul connections:* Of course, the CMAP needs a backhaul connection to the CMTS and it needs to be close enough to an AC power inserter on the CATV cable to assure that it will be able to pull 60 watts at greater than 45 VAC. If not, then another power inserter must be installed closer to the CMAP. The CATV signal level must be roughly 5 dBmV at the tap connection to the unit.

6 Powering the CMAP

The CMAP supports both POC (AC) and DC power. Depending on whether you have access to 45 to 90 VAC on the CMTS CATV cable or would prefer to power it with 120-240 VAC and a 12 VDC adaptor, follow the relevant procedure below.

Using DC Power (Staging or Debugging Only)

Use DC power to supply power to the CMAP only when you are staging or debugging the device in a lab environment. When performing the actual deployment of the CMAP, you must use POC (see [“Using Power Over Cable \(Actual Deployment\)”](#) in the next section).

To supply power to the CMAP using DC power

1. Obtain a DC power supply (see *DC Power Supply* in [“Connectors”](#) on page 31).
2. Connect the DC power supply to the DC connector (shown in [Figure 19](#)).
3. Connect the DC adapter to a 120 -240 VAC source.

You have completed connecting the CMAP to a DC power source.

Using Power Over Cable (Actual Deployment)

When performing actual deployment of the CMAP, you must use only POC via an F-type coaxial cable that is connected to the CMTS backbone.

To supply power to the CMAP using POC

1. Insert the F-type coaxial cable that is connected to the CMTS backbone to the F-type connector (Connector B) on the CMAP. Power is supplied through a power passing tap on the CATV coax. The tap is connected to Connector B on the CMAP.
2. Finger tighten the coaxial cable connector and then tighten to the recommended torque specifications for the connector type that you are using.
3. Verify that the CMAP is receiving power by checking if any of the LEDs is on.

You have completed supplying power to the CMAP using POC.


7 Verifying Access Point Operation

After powering the CMAP, you can verify that the access point is operating normally by associating a wireless client with it.




NOTE: The following procedure uses a wireless client that is running on Windows. If using a wireless client that is running on a different operating system, refer to that operating system's documentation for instructions on how to associate with an access point.

To associate a wireless client with the AP

1. Obtain a Windows computer with a built-in or external wireless card.
2. In the system tray, right-click the  (Wireless Network Connection) icon, and then click **View Available Wireless Networks**.
3. In the list of available wireless network, click the network with the same SSID as you configured in "[Step 4: Configure the Wireless Settings](#)" on page 10. For example, if you set the SSID to Ruckus Wireless AP, click the wireless network named **Ruckus Wireless AP**.

If ZoneDirector is managing the access point, the wireless settings would have been included in the configuration file that the access point downloaded when it registered with ZoneDirector. Check with your CMTS administrator and ask for the SSID that the access point has been configured with.

4. Click **Connect**.

Your wireless client connects to the wireless network. After the wireless client connects to the wireless network successfully, the wireless client icon in the system tray changes to .

5. Verify that you can connect to the Internet by starting your Web browser, and then visiting <http://www.ruckuswireless.com>. If you are able to view the Ruckus Wireless web site, then your wireless client is able to successfully connect to the Internet through the access point.

You have completed verifying the access point operation.

8 Switching LEDs to Cable Modem Mode

The LEDs indicate the statuses of both the access point and cable modem components. However, they can only show the status of one or the other at a time – either access point status only (*AP Mode*) or cable modem status only (*CM Mode*).

When the access point boots up, the LEDs are in *CM Mode*. Once it completes the bootup process, the LEDs alternate between *CM Mode* and *AP Mode*. The LEDs are color-coded to enable you to quickly identify the current LED mode:

- If you see an *orange* LED, the LEDs are in *AP Mode*.
- If you see a *white* LED, the LEDs are in *CM Mode*.

If you want the LEDs to stay in *CM Mode*, you need to manually switch them to *CM Mode*. You can switch to *CM Mode* through the following methods:

- [Using the AP's Web Interface to Switch to CM Mode](#)
- [Using SNMP to Switch to CM Mode](#)

Using the AP's Web Interface to Switch to CM Mode

To use the Web interface to switch the LEDs to CM Mode

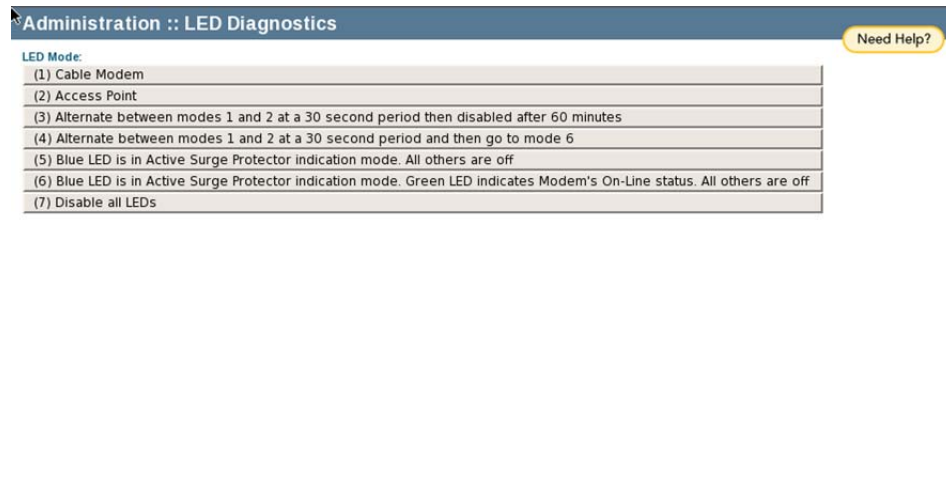
1. Log onto the access point's Web interface.
2. On the menu, click **Administration > LED Diagnostics**.
3. In *LED Mode*, click one of the following modes:
 - **(1) Cable Modem:** Click this option if you want the LEDs to stay in *CM Mode* until you switch them to another mode.
 - **(3) Alternate between modes and 1 at 30 second period then disabled after 60 minutes:** Click this option if you want the LEDs to switch to *CM Mode* as soon as you click **Save**, and then alternate with *AP Mode* every 30 seconds.
4. Click **Save**.
5. Check the access point for a white LED. This indicates that the LEDs are now in *CM Mode*.



NOTE: If you see an orange LED, this indicates that the LEDs are still in *AP Mode*.

You have completed switching the LEDs to *CM Mode* using the access point's Web interface.

Figure 21. The LED Diagnostics page



Using SNMP to Switch to CM Mode

Use SNMP to set MIB values on the CMAP that control the LED mode.



NOTE: Before starting this procedure, you must first obtain the related MIBs from Ruckus Wireless. Contact your authorized Ruckus Wireless sales representative or Ruckus Wireless Support. Visit <http://support.ruckuswireless.com/contacts> for contact information.

To switch the LEDs to CM Mode using SNMP

1. Start your MIB browser.
2. Load the Ruckus Wireless MIBs onto the MIB browser.
3. In the MIB browser, specify the IP address of the CMAP that you want to configure.
4. Find the OID **1.3.6.1.4.1.25053.3.1.4.7.3** (ruckusZF7761CMControlLED).
5. Set the value to one of the following:
 - **1:** `ledPerCM(1)` – After you set the LEDs to *CM Mode*, they will stay in *CM Mode* until you switch them to another mode.
 - **2:** `ledPerCMOneHour(2)` – After you set the LEDs to *CM Mode*, they will stay in *CM Mode* for one hour, and then they will turn off.
6. Check the CMAP for a white LED. This indicates that the LEDs are now in *CM Mode*.



NOTE: If you see an orange LED, this indicates that the LEDs are still in *AP Mode*.

You have completed switching the LEDs to *CM Mode* using SNMP.

9 Resetting the Access Point to Factory Default Settings

There are two ways to reset the access point to factory default settings:

- [Using the Reset Switch on the DC Power Supply](#)
- [Using SNMP to Reset the Access Point](#)



CAUTION: Resetting the access point to factory default settings will erase all the settings that you have previously configured on the device. Note, too, that this will disrupt all wireless network communications through this device.

Using the Reset Switch on the DC Power Supply

The DC power supply (see *DC Power Supply* in "[Connectors](#)" on page 31) includes a reset switch that you can use to reset the access point to its factory default settings.



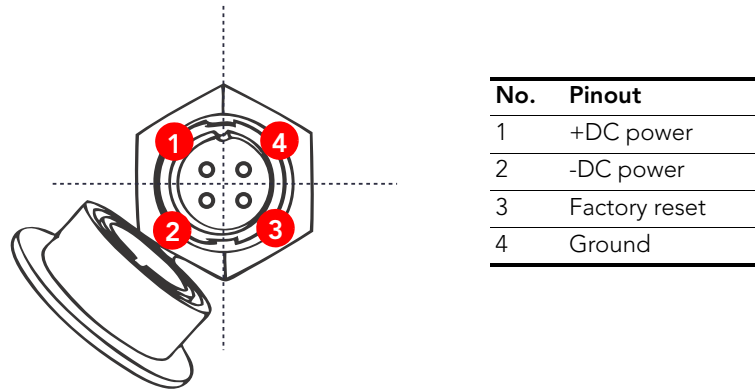
CAUTION: Performing this procedure resets both the CM and AP components to their factory default settings. If you only want to reset the AP component to its factory default setting, perform the procedure described in "[Using the Reset Switch on the DC Power Supply](#)" on page 40 instead.

To reset the access point to factory defaults the DC power supply

1. Verify that the access point is receiving power from the coaxial cable.
2. If the DC connector on the access point is protected by its cap, remove the cap.
3. Connect the DC adapter to the DC connector on the access point.
4. Connect the DC power adapter to a power source.
5. Press the reset switch (labeled 3 in [Figure 4](#)) for eight seconds.

The LEDs go off as the access point resets itself to factory default settings. When the orange LED comes on, it indicates that the access point has completed the reset process.

Figure 22. Pinout connections for the DC connector



Using SNMP to Reset the Access Point

You can use SNMP on either the access point or cable modem to reset the AP to factory default settings. The procedure is the same, regardless whether you perform this operation from the AP or CM.



CAUTION: Performing this procedure resets only the AP component to its factory default settings. If you want to reset both the CM and AP components to factory default settings, perform the procedure described in [“Using the Reset Switch on the DC Power Supply”](#) on page 40 instead.

Before You Begin

Before starting this procedure, you must first obtain the following:

- The IP address that is assigned to the access point that you want to reset to factory default settings. You can obtain this information from the DHCP server on the network.
- Obtain the related MIBs from Ruckus Wireless. Contact your authorized Ruckus Wireless sales representative or Ruckus Wireless Support. For the Ruckus Wireless Support contact information, visit the following Web address:

<http://support.ruckuswireless.com/contacts>

To reset the access point to factory defaults using SNMP

1. Connect the administrative computer to the same network as the access point.
2. Start your MIB browser.
3. Load the Ruckus Wireless MIBs onto the MIB browser.

Resetting the Access Point to Factory Default Settings

Using SNMP to Reset the Access Point

4. In the MIB browser, specify the IP address of the access point that you want to reset to factory default settings.
5. Find the OID **1.3.6.1.4.1.25053.3.1.4.7.3** (ruckusZF7761CMControlLED).
6. Set the value to **12** (factoryResetAP).

You have completed resetting the access point to factory default settings using SNMP.

10 Resetting the CM to Factory Default Settings

You can also use SNMP on either the access point or cable modem to reset the CM to factory default settings. The procedure is the same, regardless whether you perform this operation from the AP or CM.



CAUTION: Performing this procedure resets only the CM component to its factory default settings. If you want to reset both the CM and AP components to factory default settings, perform the procedure described in [“Using the Reset Switch on the DC Power Supply”](#) on page 40 instead.

Before You Begin

Before starting this procedure, you must first obtain the following:

- The IP address that is assigned to the access point that you want to reset to factory default settings. You can obtain this information from the DHCP server on the network.
- Obtain the related MIBs from Ruckus Wireless. Contact your authorized Ruckus Wireless sales representative or Ruckus Wireless Support. For the Ruckus Wireless Support contact information, visit the following Web address:

`http://support.ruckuswireless.com/contacts`

To reset the access point to factory defaults using SNMP

1. Connect the administrative computer to the same network as the cable modem.
2. Start your MIB browser.
3. Load the Ruckus Wireless MIBs onto the MIB browser.
4. In the MIB browser, specify the IP address of the cable modem that you want to reset to factory default settings.
5. Find the OID **1.3.6.1.4.1.25053.3.1.4.7.3** (ruckusZF7761CMControlLED).
6. Set the value to **15** (factoryResetCM).

You have completed resetting the cable modem to factory default settings using SNMP.

11 Mounting the CMAP

To mount the CMAP assembly on a cable strand, you need to secure the cable clamps that are attached to the strand interface bracket to the cable strand.



NOTE: The CMAP must be installed on a cable strand by a professional cable installer.

The CATV coaxial cable used in the actual field deployment must have 45 to 90 VAC power multiplexed with the RF signal on the coaxial cable since Connector B is used for both electrical power and the RF signal.

To mount the CMAP

1. Slightly loosen the square nuts that fasten the two cable clamps to the strand bracket, enough for the strand support cable to fit into the cable clamps.
2. Place the cable clamps on the strand support cable.
3. Tighten the two square nuts to approximately 16 ft-lbs to secure the mounting.
4. Connect the CATV connector from the cable lines to Connector B on the CMAP. Select a CATV power passing tap that will supply a signal level between -15 and +15 dBuV at its output (prefer 0 to 6 dBuV). Connect the CMAP's Connector B to the tap's output using an RG6 quad shield cable.

NOTE: You may use the CMAP's loop-through function on Connector A to measure the downstream signal level at the internal cable modem. Connector A's signal level is approximately 9 dB lower than the signal at the input to the modem.

You have completed mounting the CMAP on the cable strand.

You may now install the three external antennas. See [“Installing the Antennas”](#) on page 45 for more information.

12 Installing the Antennas

After you mount the CMAP on the cable strand, the next step is to install the three 5GHz antennas that are supplied with the CMAP.



CAUTION: To avoid damaging the antennas, Ruckus Wireless strongly recommends that you install the antennas only after you mount the CMAP on the cable strand and have attached the strand coaxial cable to Connector B. See the preceding section.

To install the external antennas

1. Take out the three antennas that were shipped with the CMAP.
2. Locate the three N type female bulkhead connectors on the underside of the strand interface.
3. Take one antenna and then mate its end (N type male connector) with the N type female bulkhead connector on the strand interface.
4. Using your fingers, turn the connector nut only on the antenna to tighten the connection.
5. Repeat the previous two steps for the two remaining antennas.
6. Verify that all three antennas are securely attached to the strand interface.
7. Verify that all antenna connectors from the strand interface are securely fastened to the CMAP.

You have completed attaching the external antennas to the strand interface.



NOTE: After verifying correct connections and correct operation, you may choose to wrap the connectors with self-fusing tape if you deem that they require protection from local weather.

13 What to Do Next

The following are some of the post-installation tasks that Ruckus Wireless recommends. Refer to the *ZoneFlex 7761CM Dual Band 802.11n Outdoor Access Point with Integrated Cable Modem User Guide* for more information on configuring and managing the access point.

Change the Administrative Password

Management access to the Web interface of the access point is controlled through administrative user name and password. As soon as you complete the access point setup, make sure you log on to the access point's Web interface and change the default administrative user name and password. This will help prevent unauthorized users from logging in to the access point's Web interface and changing the access point settings to compromise your network.

Read Related Documentation

If you are using FlexMaster or ZoneDirector to manage the access point, make sure you read the accompanying documentation to learn how to configure and manage the access point from the FlexMaster and ZoneDirector Web interface.

The latest versions of Ruckus Wireless access point documentation are available for download on the Ruckus Wireless Support Web site at:

<http://support.ruckuswireless.com/documents>

14 Troubleshooting

This section lists some information that may be useful in troubleshooting the CMAP. Topics discussed include:

- [Retrieving the CM's MAC Address](#)
- [How Radio Frequency Scanning Works](#)
- [Contacting Ruckus Wireless Support](#)

Retrieving the CM's MAC Address

There are some configuration operations that require you to enter the CM's MAC address. If the CM's MAC address is not printed on the CMAP, you can retrieve it via the command line interface.

To perform this procedure, you will need the following:

- An administrative computer

- An Ethernet cable
- A Telnet or SSH (secure shell) client program

Do the following

1. Connect one end of the Ethernet cable to the administrative computer's Ethernet port, and then connect the other end to the CMAP's Ethernet port.
2. Change the administrative computer's IP address to the same subnet as the CMAP. The CM's default IP address is 192 . 168 . 100 . 1.
3. Start the Telnet or SSH client program on the administrative computer.
4. Log onto to the CM via Telnet or SSH using the following logon details:
 - User name: **super**
 - Password: **mso-admin**
5. When the command prompt appears, enter the following command:

```
cd n
cd hal
mac_address 1
```

The command prompt displays the CM's MAC address.

How Radio Frequency Scanning Works

To perform radio frequency scanning, the AP does the following:

1. Looks at the last "known good channel" (repeat this every 64 channel checks).
2. Checks the sixteen last known frequencies (repeat this every 32 channel checks).
3. Scans standard channels (where the center of the channel is an integer spaced by 6 MHz), first [from 94.25 MHz to 1001.25 MHz - 152 channels].
4. Scans the harmonically related carriers (HRC) channels, which moves the channels 1.25 MHz off the standard frequencies so the video carriers are all related by 6 MHz [from 93 to 999 MHz - 152 channels].

A complete frequency scan requires approximately 469 channel checks. Since each channel takes about 0.6 seconds, a full scan is done every 281 second (a little under 5 minutes).

Contacting Ruckus Wireless Support

For assistance in troubleshooting other issues that are not described in this guide, contact Ruckus Wireless technical support (see below):

- Email: support@ruckuswireless.com
- Web Site: <http://support.ruckuswireless.com/>

Troubleshooting

Contacting Ruckus Wireless Support

- Support Forum: <http://forums.ruckuswireless.com/>