

# Cisco MWA1221

## MoCA to Wireless Adapter



## Notice for Installers

The servicing instructions in this notice are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions, unless you are qualified to do so.

### Note to System Installer

For this apparatus, the cable shield/screen shall be grounded as close as practical to the point of entry of the cable into the building. For products sold in the U.S. and Canada, this reminder is provided to call the system installer's attention to Article 810-63 and Article 800-100 of the NEC (or Canadian Electrical Code Part 1), which provides guidelines for proper grounding of the cable shield.



This symbol is intended to alert you that uninsulated voltage within this product may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any inside part of this product.

Ce symbole a pour but d'avertir toute personne qu'un contact avec une pièce interne de ce produit, sous tension et non isolée, pourrait être suffisant pour provoquer un choc électrique. Il est donc dangereux d'être en contact avec toute pièce interne de ce produit.



CAUTION: To reduce the risk of electric shock, do not remove cover (or back). No user-serviceable parts inside. Refer servicing to qualified service personnel.

WARNING: TO PREVENT FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.




This symbol is intended to alert you of the presence of important operating and maintenance (servicing) instructions in the literature accompanying this product.

Ce symbole a pour but de vous avertir qu'une documentation importante sur le fonctionnement et l'entretien accompagne ce produit.

20080614\_Installer 600

## IMPORTANT SAFETY INSTRUCTIONS

- 1) Read these instructions.
- 2) Keep these instructions.
- 3) Heed all warnings.
- 4) Follow all instructions.
- 5) Do not use this apparatus near water.
- 6) Clean only with dry cloth.
- 7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- 8) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- 9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- 9) The Power sourcing equipment (PSE) is going to provide power over Ethernet to the Powering Device (PD) via Ethernet connection w/ power loading 15.6W (typical) and 17.6W (max). The PSE and PD will be connected via Ethernet cable for power and signal transmission.
- 10) Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- 11) Only use attachments/accessories specified by the manufacturer.
- 12)  Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
- 13) Unplug this apparatus during lightning storms or when unused for long periods of time.
- 14) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as a power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- 15) Only use permitted approved powering device (PD) which meet 802.3af or  
a) This product will not guarantee to detect and supply power.  
b) This product will work in oscillation (go on and off) because of bad powering device.
- 16) This product is for indoor use only.

### Power Source Warning

A label on this product indicates the correct power source for this product. Operate this product only from an electrical outlet with the voltage and frequency indicated on the product label. If you are uncertain of the type of power supply to your home or business, consult your service provider or your local power company. The AC inlet on the unit must remain accessible and operable at all times.

### Ground the Product



**WARNING: Avoid electric shock and fire hazard! If this product connects to cable wiring, be sure the cable system is grounded (earthed). Grounding provides some protection against voltage surges and built-up static charges.**

### Protect the Product from Lightning

In addition to disconnecting the AC power from the wall outlet, disconnect the signal inputs.

### Verify the Power Source from the On/Off Power Light

When the on/off power light is not illuminated, the apparatus may still be connected to the power source. The light may go out when the apparatus is turned off, regardless of whether it is still plugged into an AC power source.

## Eliminate AC Power/Mains Overloads



**WARNING: Avoid electric shock and fire hazard! Do not overload AC power/ mains, outlets, extension cords, or integral convenience receptacles. For products that require battery power or other power sources to operate them, refer to the operating instructions for these products.**

## Provide Ventilation and Select a Location

- Remove all packaging material before applying power to the product.
- Do not place this apparatus on a bed, sofa, rug, or similar surface.
- Do not place this apparatus on an unstable surface.
- Do not place this apparatus in excessive heat or moisture.
- Do not install this apparatus in an enclosure, such as a bookcase or rack, unless the installation provides proper ventilation.
- Do not place entertainment devices (such as VCRs or DVDs), lamps, books, vases with liquids, or other objects on top of this product.
- Do not block ventilation openings.

## Operating Environment

This product is designed for operation indoors with a temperature range from 32° to 122° F (0° to 50°C). Each product should have adequate spacing on all sides so that the cooling air vents on the chassis are not blocked.

## Protect from Exposure to Moisture and Foreign Objects



**WARNING: Avoid electric shock and fire hazard! Do not expose this product to dripping or splashing liquids, rain, or moisture. Objects filled with liquids, such as vases, should not be placed on this apparatus.**



**WARNING: Avoid electric shock and fire hazard! Unplug this product before cleaning. Do not use a liquid cleaner or an aerosol cleaner. Do not use a magnetic/ static cleaning device (dust remover) to clean this product.**



**WARNING: Avoid electric shock and fire hazard! Never push objects through the openings in this product. Foreign objects can cause electrical shorts that can result in electric shock or fire.**

## Service Warnings



**WARNING: Avoid electric shock! Do not open the cover of this product. Opening or removing the cover may expose you to dangerous voltages. If you open the cover, your warranty will be void. This product contains no user-serviceable parts.**

## Check Product Safety

Upon completion of any service or repairs to this product, the service technician must perform safety checks to determine that this product is in proper operating condition.

## Protect the Product When Moving It

Always disconnect the power source when moving the apparatus or connecting or disconnecting cables.

20110316\_IP\_No Tuner\_Safety

## Compliance Information United States FCC Compliance

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 such interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment OFF and ON, the user is encouraged to try to correct the interference by one or more of the following measures:

- 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 service provider or an experienced radio/television technician for help.
- Any changes or modifications not expressly approved by Cisco Systems, Inc., could void the user's authority to operate the equipment.

The information shown in the FCC Declaration of Conformity paragraph below is a requirement of the FCC and is intended to supply you with information regarding the FCC approval of this device. The phone numbers listed are for FCC-related questions only and not intended for questions regarding the connection or operation of this device. Please contact your service provider for any questions you may have regarding the operation or installation of this device.





**WARNING:** The switch is to be connected only to PoE networks without routing to the outside plant.

## FCC Declaration of Conformity

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

APS (Advanced Power Supply) Family  
Models CA010AAB, APS1, MVA1221,  
Manufactured by: Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134 USA  
[www.cisco.com/go/contacts](http://www.cisco.com/go/contacts)

## Canada EMI Regulation

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la class B est conforme à la norme NMB-003 du Canada.

20081121 FCC Standard

## Disclaimer

Cisco Systems, Inc. assumes no responsibility for errors or omissions that may appear in this manual. We reserve the right to change this manual at any time without notice.

## Federal Communication Commission Interference Statement

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

For operation within the 5150–5250 MHz frequency ranges, it is restricted to indoor environment.

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.

## IMPORTANT NOTE:

### FCC RF Exposure Statement:

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

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

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination. The firmware setting is not accessible by the end user.

### 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.

### Caution:

The device for the bands 5150–5250 MHz is only for indoor usage to reduce potential for harmful interference to co-channel mobile satellite systems.

The maximum antenna gain permitted (for devices in the band 5725–5825 MHz (3 dBi)) to comply with the e.i.r.p. limits specified for point-to-point and non point-to-point operation as appropriate, as stated in section A9.2(3).

High power radars are allocated as primary users (meaning they have priority) of 5650–5850 MHz and these radars could cause interference and/or damage to LE-LAN devices.

## IMPORTANT NOTE:

### Canada RF Exposure Statement:

This system has been evaluated for radiofrequency exposure for humans in reference to Canada Health Code 6 (2009) limits. The evaluation was based on evaluation per RSS-102 Rev 4. The minimum separation distance from the antenna to general bystander is 7.9 inches (20cm) to maintain compliance.

**Note:** CA010AAB, APS1, MVA1221 have disabled the 5600–5650M band by S/W to avoid 5600–5650M band for IC certification.

# MWA1221 User Manual

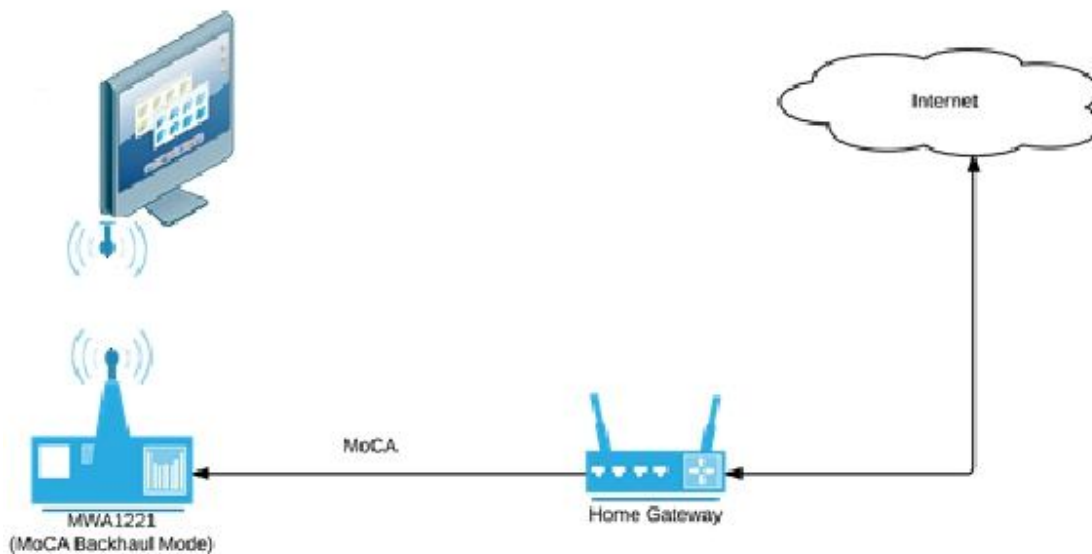
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## Overview

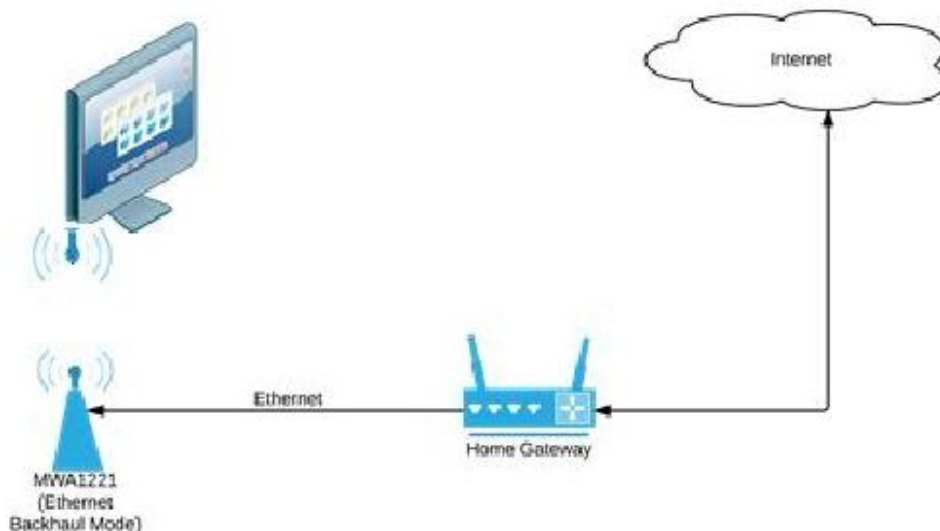
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The MWA1221 (MoCA to Wireless Adapter) product can be used in multiple deployment configurations. This user manual address the below configurations:

- In this case, the MWA1221 is connected with the home gateway via MoCA (MoCA Backhaul mode) and it extends data coverage to other unmanaged devices which would otherwise be out of reach to the main gateway. The MWA1221 behaves like a WiFi extender. In parallel, MWA1221 can also bridge traffic on the Ethernet interface to another device connected to it via Ethernet. Additionally, MWA1221 is equipped with Power Over Ethernet (PoE) and thus would be able to provide power to the device connected over Ethernet as per the 802.3af standard ([IEEE 802.3] Section 2, Annex 33).



- In this case, the MWA1221 is connected with the home gateway via Ethernet (Ethernet Backhaul model) and it extends data coverage to other unmanaged devices which would otherwise be out of reach to the main gateway. MWA1221 behaves like a WiFi extender.



Identify your Device:

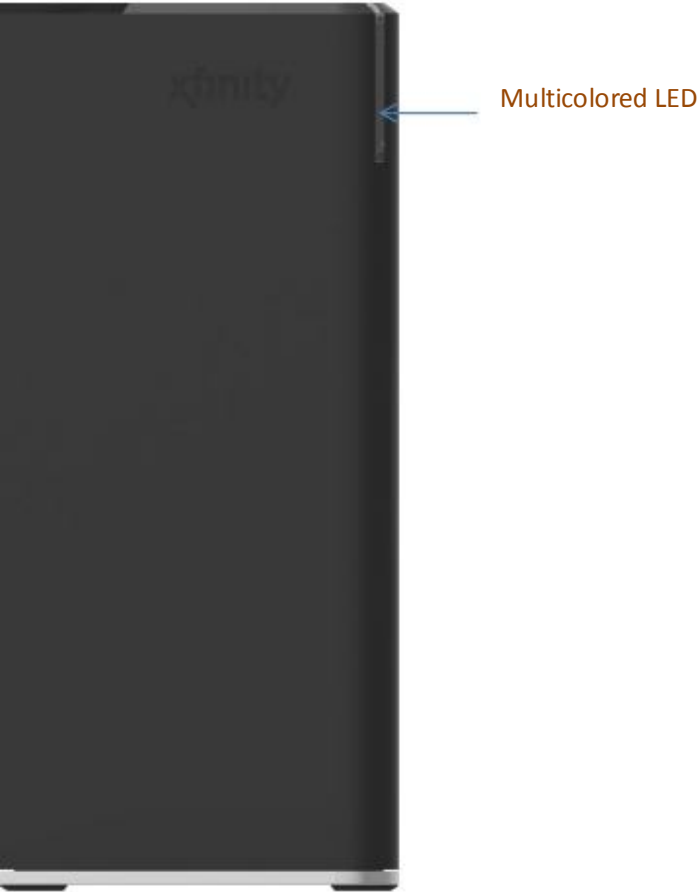
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If you device requires troubleshooting in the future, your service provider may ask for the serial number. The serial number can be located on the label found at the bottom of the device.



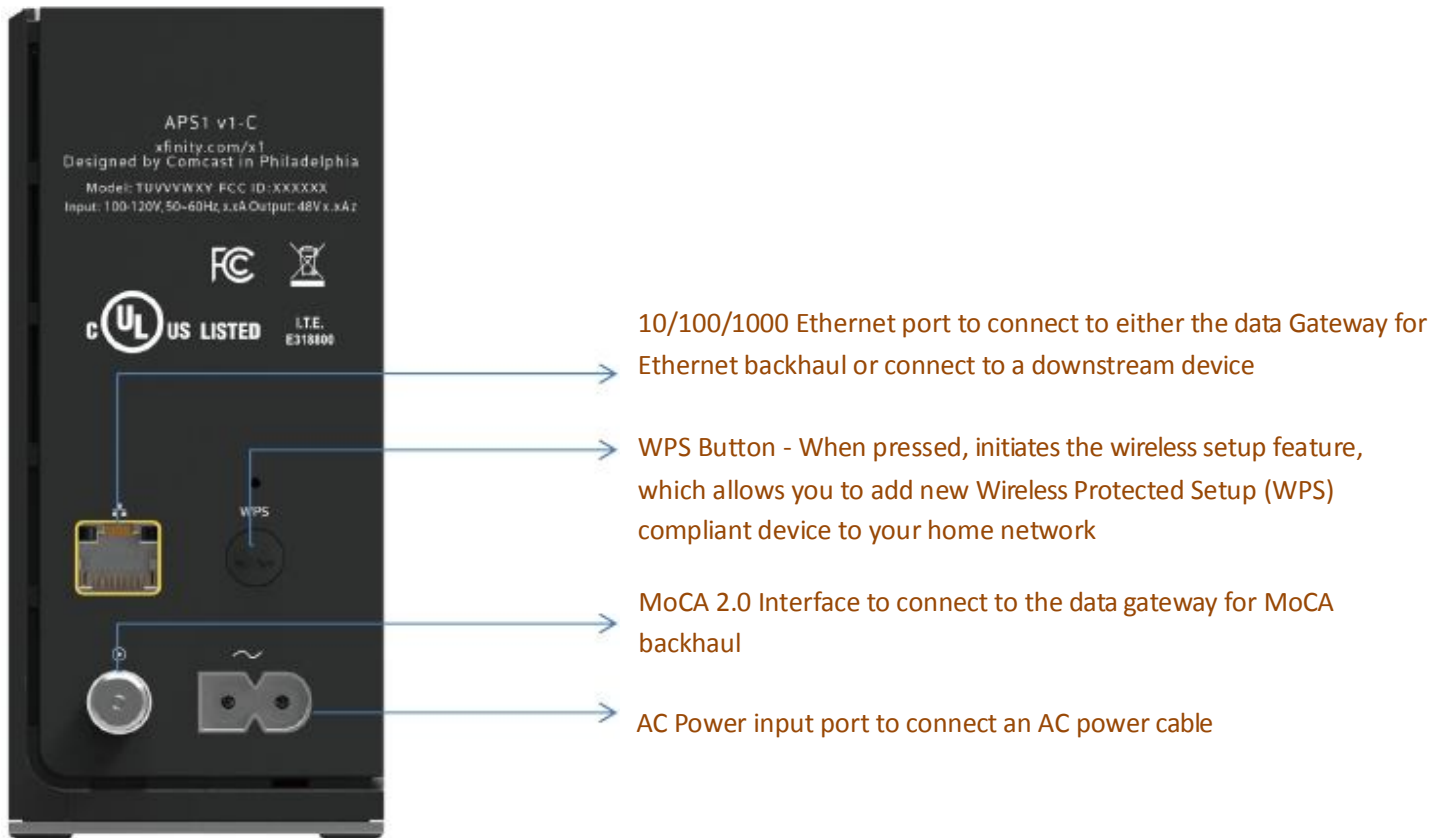
Front Panel:

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## Rear Panel:

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### Note:

- The illustration may vary from the actual product
- The usage of ports may vary if additional use cases are implemented

Terms and Definitions

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Term	Definition
Boot Mode	The first MWA1221 Mode at the start of each power cycle or reset process. Boot Mode checks code validity prior to allowing code to execute, if successful then execute and run the code.
Connect Mode	When the MWA1221 is attempting to establish communications with the backhaul device.
Normal Mode	The MWA1221 has established communication with the backhaul device and is able to pass messages back and forth between them.
CDL (Code Download) Mode	The MWA1221 supports TR069 Download RPC method to load the new image.

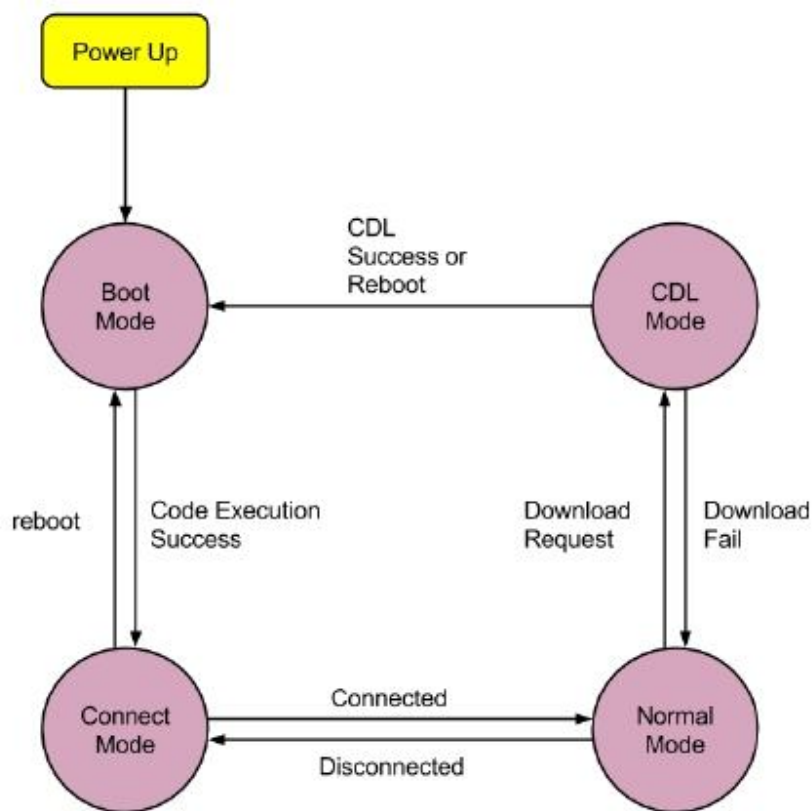
Initialization and Operations

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In order to ensure consistent operation of MWA1221 devices, this section describes the specific conditions and sequences for startup of the MWA1221 under a set of nominal and anomalous operating conditions. The use of the term Mode within this specification is set of functional requirements that do not dictate any specific system or software design or implementation.



MWA1221 Mode Overview

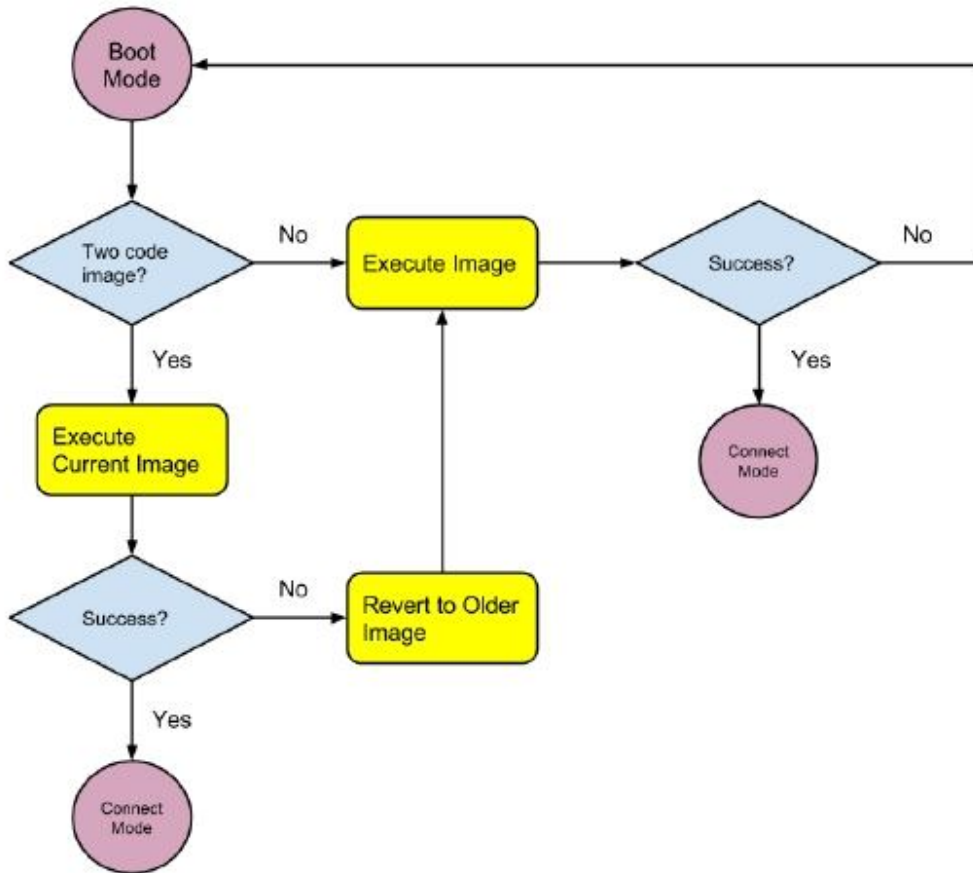


MWA1221 LED Sequence

Mode	LED	Comments
Boot	GREEN Blinking once a second	
Connect	BLUE Blinking once a second	MoCA forming network
Connect	PURPLE Blinking once a second	MoCA network formed or Ethernet network broadcast.
Normal	BLUE Solid	
CDL	YELLOW Blinking once a second	When the MWA1221 is actively downloading, validating and writing to memory a new code object.

## Boot Mode

The MWA1221 product supports the Boot Mode process as illustrated in the following figure:



The MWA1221 would be in Boot Mode when power is first applied or a reboot/restart of code image has occurred.

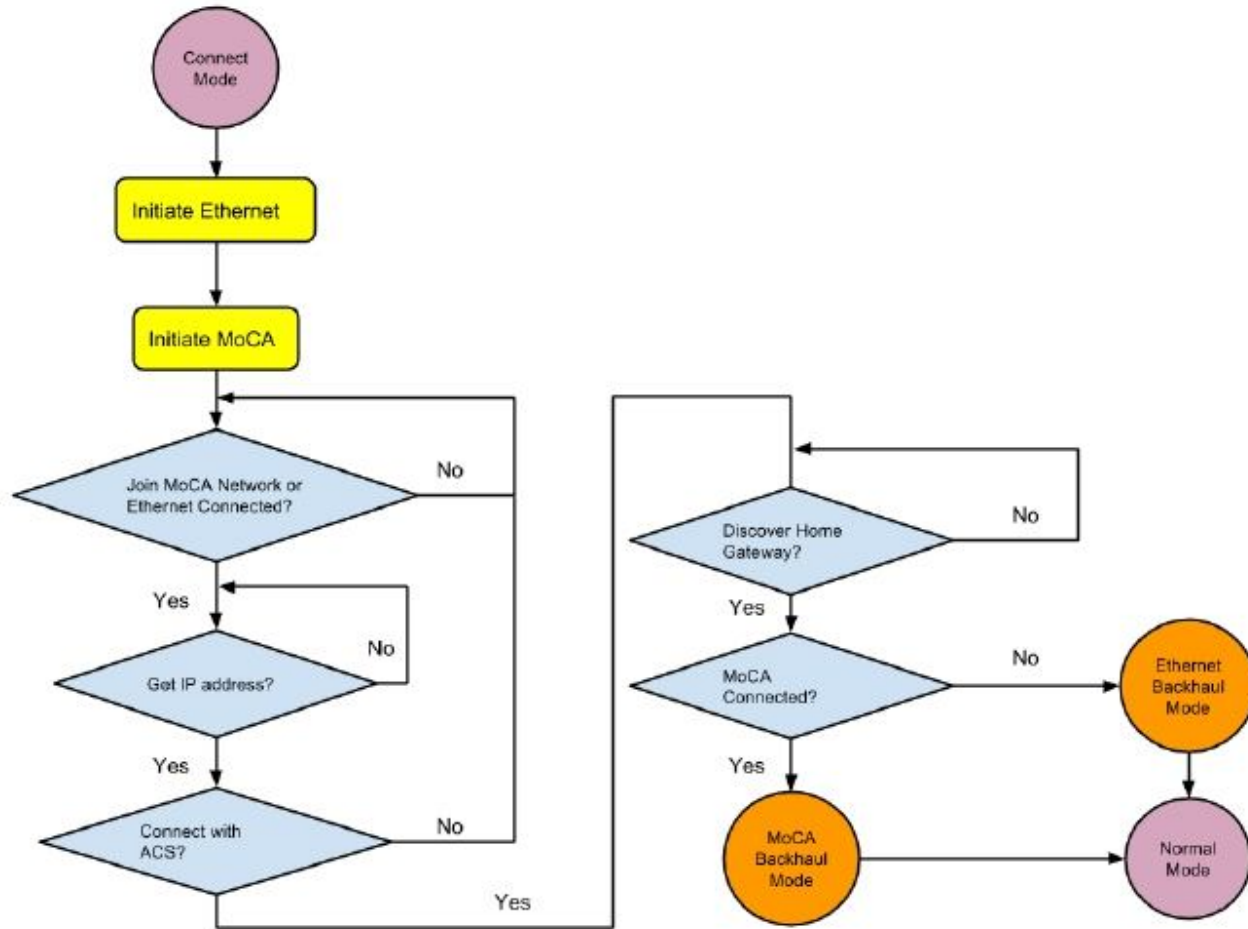
The MWA1221 supports maximum two code image stored within flash. The execution options are:

- It would attempt to execute and run the existing code image if only a single code image is stored within flash
- It would attempt to execute and run the current code image if a current and a previous code image are stored within flash
- It would execute and run the previous code image if the APS fails to execute and run the current code image and when both a current and previous code image are stored within flash.

The MWA1221 would transition to Connect Mode if the code image successfully executes and runs.

## Connect Mode

The MWA1221 product supports the Connect Mode process as illustrated in the following figure:



MWA1221 would transition to MoCA Backhaul Mode or Ethernet Backhaul Mode if the product has successfully entered Connect Mode.

The MWA1221 product would use fixed 1150MHz channel for MoCA interface to join MoCA network by default.

During IP address assignment stage, the MWA1221 supports IPv6 and IPv4 on both interfaces.

- The MWA1221 would be assigned a link-local IPv6 address, using neighbor discovery to detect duplicate addresses
- The MWA1221 would initiate Route Solicitations
- The MWA1221 would provision interface with global IPv6 address with RA prefix and interface specific address and provision interface with IPv6 link-local address if Router Announcement (RA) received and Autonomous flag == 1 and prefix != FE80::/10.
- The MWA1221 would provision interface IPv6 link-local address only if no RA received from Router Solicitations.
- The MWA1221 would provision interface IPv6 link-local address only if RA is received and Autonomous flag == 0 or prefix == FE80::/10
- The MWA1221 would initiate DHCPv6 if global IPv6 address provisioning fails.

- The MWA1221 would be assigned both DHCPv6 address and IPv6 link-local address if DHCPv6 is successful.
- The MWA1221 would initiate DHCPv4 if DHCPv6 provisioning fails.
- The MWA1221 would be assigned both DHCPv4 address and IPv6 link-local address if DHCPv4 is successful.

MWA1221 uses UPnP protocol to discover the uplink home gateway. If it is found, the MWA1221 product would enter MoCA Backhaul Mode if MoCA Interface is UP state, otherwise the MWA1221 would enter Ethernet Backhaul Mode.

In MoCA Backhaul Mode, The MWA1221 products bridge Ethernet frames received on the MoCA interface from the LAN to the 10/100/1000 Base-TX interface. Likewise, the MWA1221 products bridges Ethernet frames received on the 10/100/1000 Base-TX interface to the MoCA interface, which in turn forwards to the MoCA connected LAN. The MWA1221 product also extends the Wi-Fi coverage within the home, bridging Ethernet frames received on MoCA to the WLAN and likewise from the WLAN to MoCA. One can also connect an IP Client to the Ethernet interface in the MOCA backhaul case. The IP client set-top box product connected to Ethernet interface may also receive Ethernet frames from the WLAN from devices in communication with the IP client set-top box product and likewise send Ethernet frames to the WLAN to devices that the IP client set-top box is in communication with. The MWA1221 would use a static private IP address of 192.168.100.101 on the Ethernet interface in MoCA Backhaul Mode.

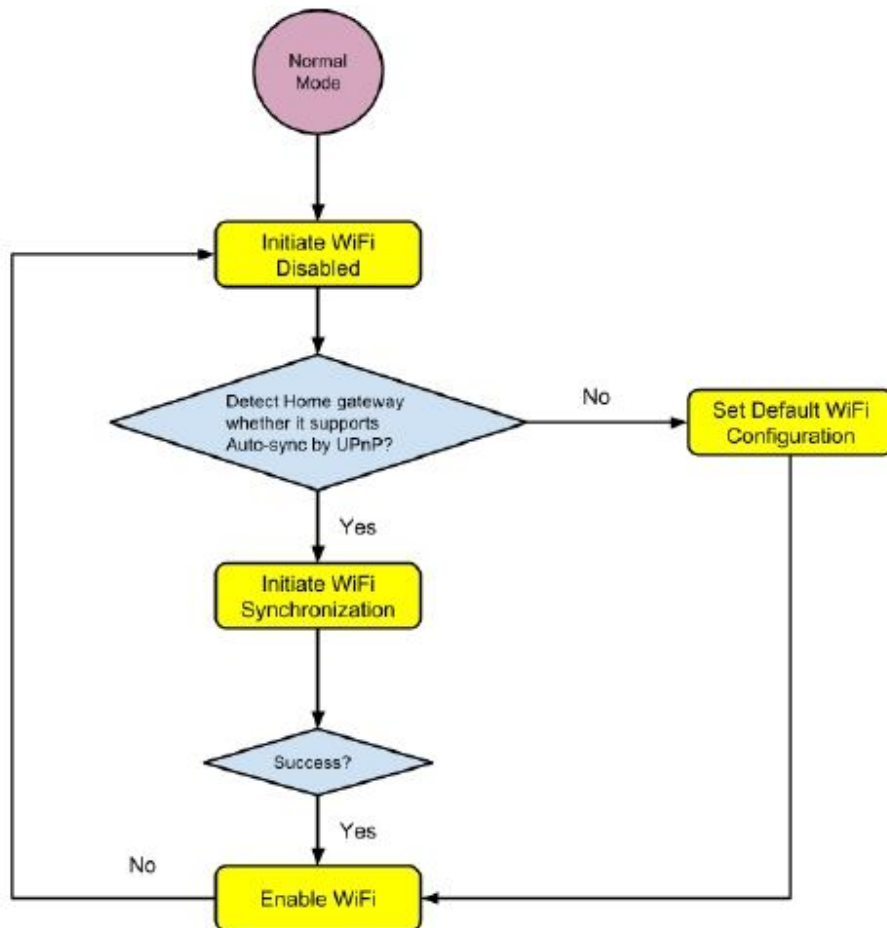
In Ethernet Backhaul Mode, The MWA1221 product extends the Wi-Fi coverage within the home operating as a WiFi-Ethernet-Bridge, bridging Ethernet frames received on Ethernet to the WLAN and likewise from the WLAN to Ethernet.



### Normal Mode

When connected with gateway from MoCA interface or Ethernet interface, MWA1221 will enter Normal Mode. MWA1221 will try to detect whether the connected gateway support AutoSync feature via UPnP message. The Wi-Fi configuration could be synced from gateway following Specific “Wi-Fi AutoSync” protocol, or set manually on web GUI.

After entering Normal Mode, MWA1221 will wait for Wi-Fi AutoSync specific UPnP messages from gateway on either MoCA interface or Ethernet interface in 180 seconds. As if it received the specific UPnP message within 180 seconds, MWA1221 will enable Wi-Fi configuration auto-sync feature. The gateway will push all the Wi-Fi configurations to MWA1221 by “WECB AutoSync” protocol and enable the Wi-Fi radio and SSID automatically. If gateway supports “Wi-Fi AutoSync” feature, user could also modify the synchronized Wi-Fi configuration via Web GUI.



The auto-sync feature covers the following configuration parameters.

- Radio Frequency (2.4GHz / 5GHz)
- Radio Modes (802.11n, 802.11ac, etc.)
- Radio Channels
- Radio Channel Bandwidth
- Radio Beacon Interval

- Radio DTIM Interval
- Radio Guard Interval
- Radio Co-existence
- SSID Enable/Disable
- SSID Name
- SSID Mac Address (BSSID)
- SSID Broadcast
- SSID vLan ID
- SSID Encryption Security Mode
- SSID Encryption Passphrase
- SSID Encryption Rekey Interval
- SSID Encryption Radius Server IP/Port
- SSID Encryption Radius Secret
- SSID QoS (WMM/UAPSD)
- SSID Max Clients
- SSID isolation
- SSID Mac Filter
- WPS Method
- WPS Pin Code

MWA1221 also provides Web GUI for User to configure Wi-Fi. If gateway does not support “Wi-Fi AutoSync” feature, MWA1221 will enable Wi-Fi by default configuration. User could change Wi-Fi configuration from Web GUI.

Some management related web page such as MoCA, VLAN, WiFi, etc are prohibited for home users. VLAN ID could only be set from auto-sync feature. Web GUI does not support VLAN ID modification. If gateway does not support Wi-Fi auto-sync, all of the SSIDs on MWA1221 will not add VLAN ID.

Here are the details about web page privilege for administrators and home users.

<b>System</b>	Upgrade/Downgrade	O	X
	Factory Reset	O	O
	Reboot	O	O
<b>MoCA</b>	Enable	O	X
	Channel Selection	O	O
	Channel	O	O
	Beacon Power Reduction	O	X
	MoCA Privacy	O	X
<b>WiFi</b>	Operating Mode	O	O
	Channel	O	O
	Channel Bandwidth	O	X
	SSID Enable	O	O

	SSID Name	O	O
	SSID Broadcast	O	O
	SSID Encryption Security Mode	O	O
	SSID Encryption Passphrase	O	O
	SSID Encryption Radius Server IP/Port	O	X
	SSID Encryption Radius Server Secret	O	X
	SSID Mac Filter	O	O
	WPS Enable	O	O
	WPS Method	O	O

“O” stands for supported and “X” stands for not supported.

### *CDL Mode*

MWA1221 supports TR069 Download RPC method as defined in TR069 Requirement Specification: Broadband Devices. User would write the image into a backup image location only. The MWA1221 would transition to Boot Mode after successfully writing an ingested code image to flash.

MWA1221 also supports HTTP Post as defined in RFC 2616 for the upload of code images.

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