MOTOMESH 1.0
Mesh Wireless Router
Users Guide

September 2005
6881011Y53-O

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Chapter

1

Chapter 1: Product Introduction

This guide will assist you with the use, installation, and configuration of the MWR7300.

Mesh Wireless Router Defined

The Mesh Wireless Router (MWR) is a wireless device that is primarily deployed to seed and extend the range between IAPs and Subscriber Devices while simultaneously increasing the spectral efficiency of the network. MWR functionality includes:

- Maximum continuous data rate support ranging from approximately 900 Kbps for 4.9 GHz MEA components
- Maximum continuous data rate support of up to 20 Mbps for stationary 2.4 GHz 802.11 devices.
- Fixed reference for Geo-Location services
- Dynamic Route Selection
- Range Extension for all other network devices
- Automatic Load Balancing
- Network capacity optimization through small packet consolidation

Additional MWR Features

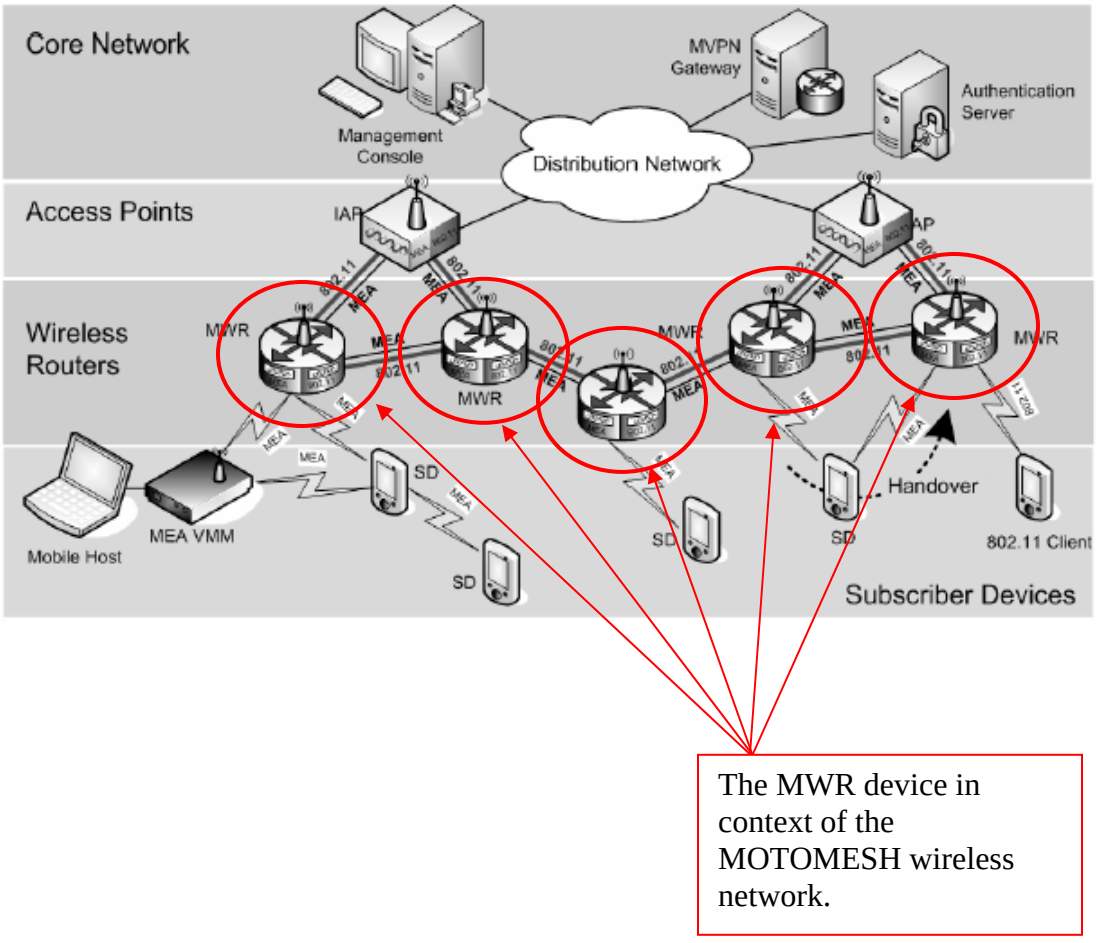
The Mesh Wireless Router (MWR) efficiently combines the functionality of a Wireless Router with two internal high-speed Ethernet ports to support a total of six IP addresses. This allows a network of IP-enabled devices to be directly addressed, accessed and managed over the MOTOMESH network. Additional IP devices/addresses can be supported by simply linking the connected devices through a NAT capable router.

MWRs Role within a MOTOMESH Wireless Network

The **MWR** and the **IAP** are considered as fixed **Infrastructure** devices. Infrastructure devices provide area coverage access for Subscriber Devices (SDs) to the wired network. IAPs act as the principal network management interface for associated MWRs and SDs. MWRs provide standard 802.11 authentications and access to the Radius server.

Both device types provide a fixed location reference for Geo-Location and wireless routing for subscriber devices in the area of coverage.

Figure 1-1 The MWR Device in Context of the Wireless MOTOMESH Network



Product Specifications

The following specifications apply to the MWR7300 as described in the table below:

Table 1-1 MOTOMESH MWR7300 Specifications

MOTOMESH MWR7300 Specifications				
	2.4GHz Portion		4.9GHz Portion	
Spectrum	2.4G – use all 80MHz		4.9G – use 30MHz	
Security	FIPS 140-2 with a VPN		FIPS 140-2 with a VPN	
Data Rates (Channel size)	*motion (20MHz)*	802.11b/g (22MHz)	*motion (20MHz)*	802.11b/g (10MHz)
1 hop	1MB	8.2Mbps	1MB	4.2Mbps
2 hop	1MB	4.1Mbps	1MB	2.1Mbps
3 hop	1MB	2.7Mbps	1MB	1.4Mbps
4 hop	1MB	2.0Mbps	1MB	1.0Mbps
Feature & Functions	• 2.4G unlicensed • vehicular motion • fast hand off • Geo Location (10m accuracy) • Client & Infra. Meshing • self-forming/healing/balancing • synchronous broadband data • wide area • low Latency • 802.11b/g • QDMA		• 4.9G licensed spectrum • vehicular motion • fast hand off • Geo Location (10m accuracy) • Client & Infra. Meshing • self-forming/healing/balancing • synchronous broadband data • wide area • low Latency • “802.11a-ish” (No standard available) • QDMA	
Backhaul; Requirements	T1 to T3 data rates required at IAPs Fixed wired, Canopy, Fiber, or Microwave		T1 to T3 data rates required at IAPs Fixed wired, Canopy, Fiber or Microwave	
Appropriate Tier of Applications Supported	Tier 1 – Tier 4		Tier 1 – Tier 4	
Equipment for 1 sq. mi	CONSULT THE CONFIGURATOR TOOL			

Enterprise Features	• Wireless bridge support • Wireless client support • Wireless distribution system • Layer 2 multicast support (pass-through) • DHCP Client • Gateway IP address configurability • Network Time Protocol (NTP) support • AES encryption support (client) • MAC access control lists • VPN pass-through • Domain name server configuration • Web (HTTP) based management interface • SNMP agent for SNMP-based remote management • Telnet interface with command-line management • Configuration of wireless parameters • Firmware update via TFTP • BSS Statistics • Per Station Statistics
Security	
VPN	FIPS-140-2: Padcom, RadioIP, NetMotion
Encryption	802.11 b/g only – 3 levels
Authentication	MEA – EAP via HAS Server, 802.11- Radius EAP, Infrastructure and Client, Client to Client

Chapter

2

Chapter 2: MWR Device Installation

This chapter will provide hardware and software installation information for the MOTOMESH MWR7300 device.

Software Requirements

There are two ways to install and setup the MWR7300 device: MeshManager or the MOTOMESH Device Administration web interface.

Between the two available setup methods, MeshManager is the preferred and comprehensive device setup, configuration, and management method. Prior to using the MeshManager software for device installation and configuration, ensure that it is installed and running on a network computer. MeshManager will be used during the device setup process to validate the installation of the device and to manage it, (as well as other devices) within the wireless network.

The MOTOMESH Device Administration web interface can be used to setup and configure the device by connecting a PC to the wired interface. Please note that the web interface does not offer all the features that are provided within the MeshManager application. Additional web interface information is provided later in the manual.

Detailed information about the MeshManager application is found in the *MOTOMESH MeshManager Users Guide*.

MWR Hardware Installation Notes

The MWR (and the IAP) provides a fixed location reference for Geo-Location and wireless routing for units in the area of coverage.

For a MOTOMESH deployment, a permanent power source for each MWR must be provided. All infrastructure devices require professional installation to ensure that the installation is performed in accordance with FCC licensing regulations

Infrastructure devices are fitted with two mounting brackets designed to be attached to light poles and other probable installation sites. Alternate mounting hardware is available for mounting directly to posts or structures that are too large for the standard brackets. Optional remote antenna mount hardware is also available for use with the alternate mounting hardware.

Equipment Specification

The specifications listed in the following table apply for all Infrastructure devices.

Table 2-2 MOTOMESH Infrastructure Device Radio Characteristics

Characteristic	2.4GHz 802.11 b/g	2.4GHz MEA	4.9GHz 802.11	4.9GHz MEA
Output Power	23 dBm	24 dBm	23 dBm	24 dBm
RF Modulation	CCK/OFDM	QDMA	OFDM	QDMA
Operating Frequency (GHz)	2.412-2.462	2.40-2.48	4.945-4.985	4.950-4.965
Maximum Burst Data Rate	54 Mbps	6 Mbps	18 Mbps	6 Mbps
Spectrum Used	20 MHz	60 MHz	10 MHz	20 MHz

The following list defines the standard hardware components for IAPs and MWRs.

- Device Enclosure with 4 N-type Female Antenna Connector
- 120V A/C Power Cable with a NEMA 5-15 plug
- 4 Antennas with N-type Male Antenna Connector
- Weatherproof RJ-45 Connectors
- Mounting Bracket (Standard and Optional)

The Network Operator must supply the following equipment.

- Mounting Location
- Power Source (120V/240V A/C 50/60 Hz)
- Ethernet connection between the IAP and the MiSC
- (2) 7/16 inch wrenches

Optional Antennas

The following antennas are recommended for use with Infrastructure devices.

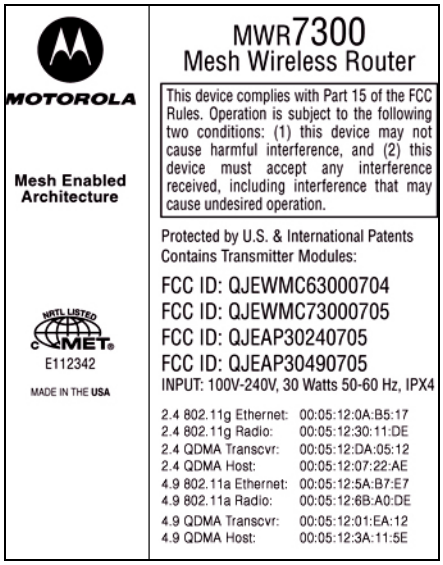
Table 2-3 Recommended Antennas for Infrastructure Devices

Manufacturer	Part Number	Gain	Usage
Hyperlink	HG2409U	8.5 dBi	2.4 GHz Infrastructure
Maxrad	MFB49009NMDC	9dBi	4.9 GHz Infrastructure
Radiall-Larsen	R380.500.223	11dBi	4.9 GHz Infrastructure

MWR Device Label

The MAC address for each device subcomponent is recorded on a label located on the device enclosure. Record this number in the provided MWR MAC Address Table section. The MAC Addresses will be required later to configure and test the device.

Figure 2-1 Infrastructure Device Product Label (sample)



MWR MAC Address Table

Table 2-4 MWR MAC Address Table

MWR Name	2.4 GHz MEA (MAC/ETH)	2.4 GHz 802.11g (MAC/ETH)	4.9 GHz MEA (MAC/ETH)	4.9 GHz 802.11a (MAC/ETH)

MWR Device Assembly

Figure 2-2 shows the external connection points for the MWR device. Figure 2-3 show the mounting bracket.

Figure 2-2 Infrastructure Device External Connection Points

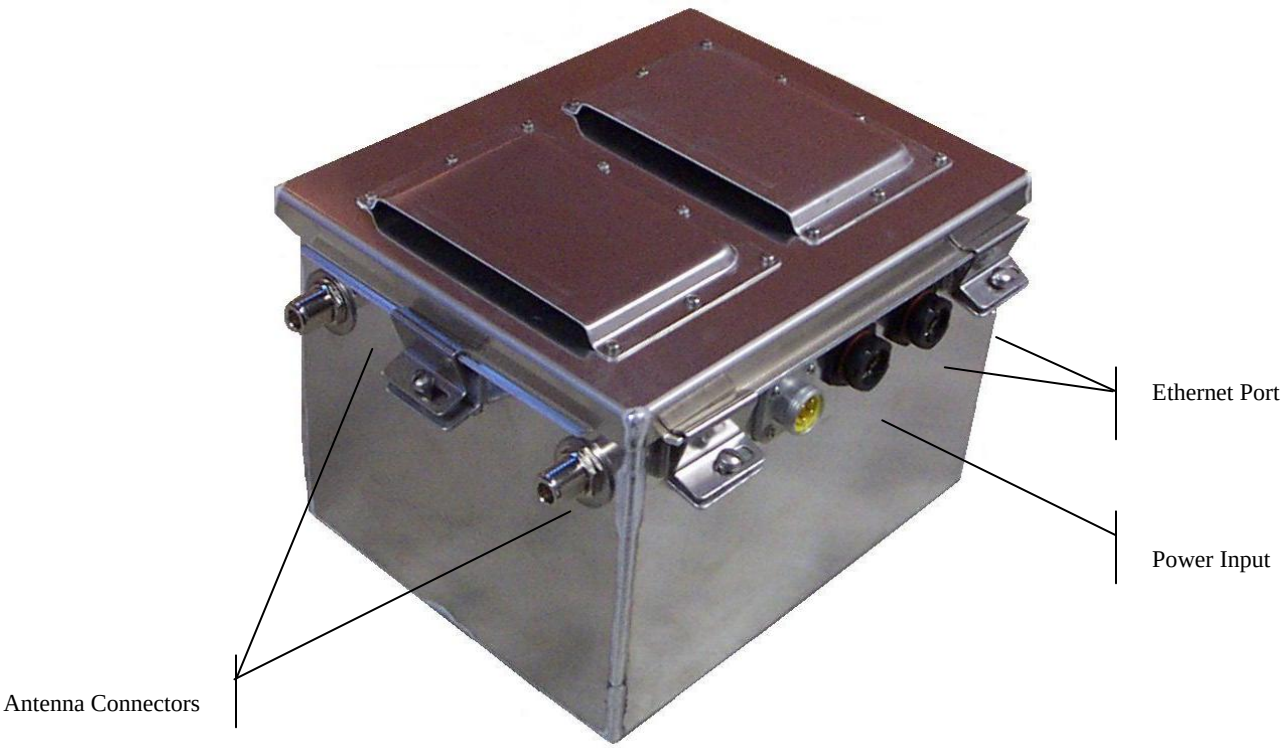
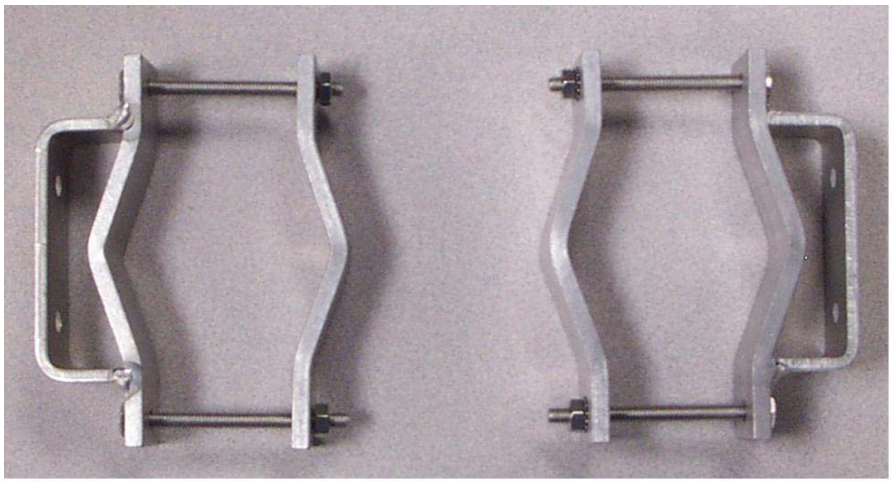


Figure 2-3 Infrastructure Device Mounting Brackets



MWR Device Deployment and Installation

The MWR device requires professional installation to ensure that the installation is performed in accordance with FCC licensing regulations. All common precautions for grounding and electrostatic discharge protection should be observed during deployment and installation.

Observe the following additional guidelines when deploying fixed Infrastructure devices (MWR and IAP):

- The MWR may be mounted on a pole having a diameter of 1-3.5 inches, utilizing the provided bracket.
- The antenna must have a separation distance of at least 2 meters from the body of all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.
- Users and installers must be provided with antenna installation and transmitter operating conditions to satisfy RF exposure compliance.
- When deploying the MWR, the antenna should be a minimum of 30 inches from any nearby metal poles to avoid distortion of the RF pattern.
- The installation location must provide power to the MWR.
- It is the responsibility of the Network Operator to ensure that the installation complies with any local building codes and permits.

Assembling the MWR Device

Use the following procedure to assemble a MWR Device.

Procedure 2-1 Assembling the MWR Device

1	Place the brackets at the desired position on the pole.
2	Adjust the position of the box so that the antenna connecters are positioned vertically. Align the antennas with the N-type connectors on the box and rotate to close.
3	Insert the cable into the external Ethernet port and tighten the connector to ensure a weatherproof seal.
4	Insert the Power Plug into the 4-pin connector.

Initial MWR Device Configuration Information

Prior to attempting configuration of a MWR device, the device must be powered up and have connectivity to the MiSC.

The Geo-location coordinates are entered into an infrastructure device via the **Device Manager** Network management tool installed on the MeshManager server (refer to the **MeshManager Users Guide**). Motorola recommends that a DGPS receiver be used to obtain accurate GPS coordinates.

The longitude, latitude, and altitude values should be entered to a precision of 5 digits following the decimal point.

Device Connectivity Testing

When a MiSC has been setup on the network, verify connectivity to the device using the following procedure:

Procedure 2-2 Testing MWR Device Connectivity

1	Apply power to the device, the device should be operation in 60 to 120 seconds
2	Obtain the MEA and 802.11 MAC addresses for the device subcomponents that were recorded in the MAC Address Table earlier in this manual. The address will be in the format 02-05-12-30-xx-yy.
3	Within MeshManager's Device Manager screen, right-click on the appropriate MWR device in the Device Tree and select the **Ping Device** option.
4	Check for a successful response to the **Ping** command in the *Named Device* results dialog box. A successful response to the ping commands verifies connectivity to the device (MWR).
5	Repeat steps 1-4 for additional MWR devices.

Chapter

3

Chapter 3: Device Configuration

This chapter contains information which will assist you with accessing the MWR via local web interface and using the available configuration options.

The web interface offers an incomplete alternative to configuring a MWR device when the network lacks a Network DHCP server. The recommended device configuration method is to use the MOTOMESH MeshManager Device Manager application, see the *MOTOMESH MeshManager Users Guide* for additional details.

Accessing the Device Administration Web Pages

The procedure below describes how to access the MWR device web page.

Procedure 3-1 Accessing the MWR Device Administration Web Interface

6	Find the IP address assigned to the MWR SBC prior to accessing the device administration web interface. You can use *MeshManager's Device Manager* to access the MWRs SBC IP address. To do this, double-click on the MWR in MeshManager's Device Tree, and then view the resulting SBC IP address information shown in the top right pane.  **IMPORTANT** *Note that by default, the device's addressing mode will be set to **Network DHCP** which means that the device will use the address assigned to it by the Network DHCP Server.* *If a fixed address was provided by the Network Operator in MeshManager, then that IP address will be used by the MWR instead of the derived address when the **Statically Provisioned** option is in effect.*
7	When the IP address is known, open your web browser and enter the IP address of the MWR SBC. For example, if the MWR SBC address is 10.128.32.1, then the web page would be found at *http://10.128.32.1/*.

Administrator and User Account Information

The device has two accounts for the web interface - an *Administrative* account (Super User), and a *User* account (Normal User). The *Administrative* account must be used for provisioning the device, and the *User* account may be used for monitoring the status of the device.

The password for the *admin* account should be changed during installation. The password for the *User* account can be changed by an administrator or the user.

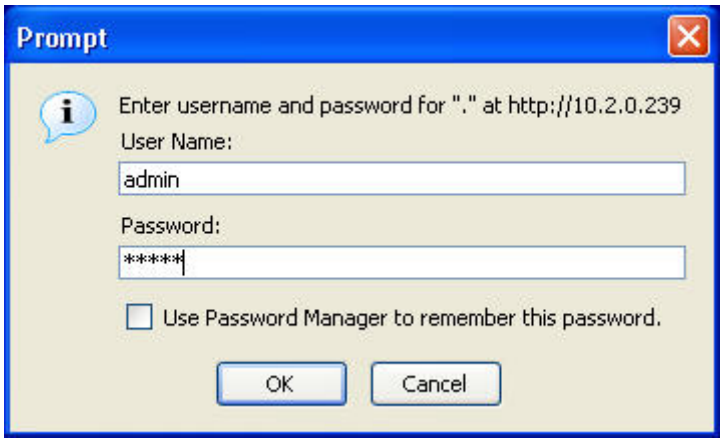
NOTE

If you are running a MWR as a standalone device, the configuration web page can be reached by connecting a PC to the wired interface. The installation procedure described here requires administrator access. Alternatively, all of the parameters that are provisioned via the web page may also be provisioned via MeshManager.

Table 3-1 Login Screen Default User Names and Passwords

Type of User	Username	Password (Default)
Administrator (Super User)	admin	admin
User (Normal User)	monitor	monitor

Figure 3-1 MOTOMESH Sample Web Interface Login Screen



Viewing the Device Administration Home Page as an Administrator

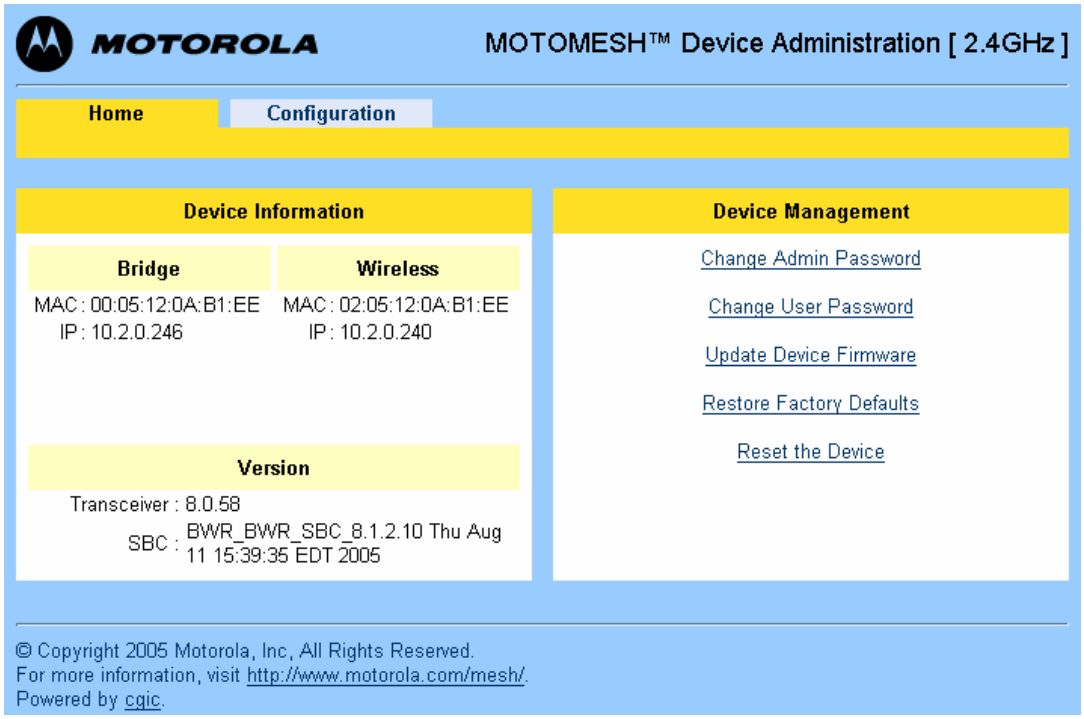
After the login authentication has been completed, the web browser will display a *redirecting* page, and your browser will automatically transition to the home web page for MOTOMESH *Device Administration.*

The *MOTOMESH Device Administration* home page provides you with some basic information about the device, including the IP addresses assigned to the device, the MAC addresses of the device, and the firmware revision number.

Additional web page links are available when logging-in as an Administrator (same as Super User). In the **Device Management** section of the **Home** tab, the Administrator can:

- Change Admin password
- Change User password (Normal User Account)
- Update Device Firmware
- Restore Factory Defaults
- Reset the Device

Figure 3-2 MOTOMESH Device Administration Home Page (Super User Login)



Viewing the Device Administration Home Page as a Normal User

The *Device Administration* home page provides the Normal User (User Account) with some basic information about the device, including the IP addresses assigned to the device, the MAC addresses of the device and the firmware revision.

In the **Device Management** section of the **Home** tab, the User Account (non-administrative account) can:

- Change User password
- Reset the Device

Viewing the MWR Device Administration Configuration Page

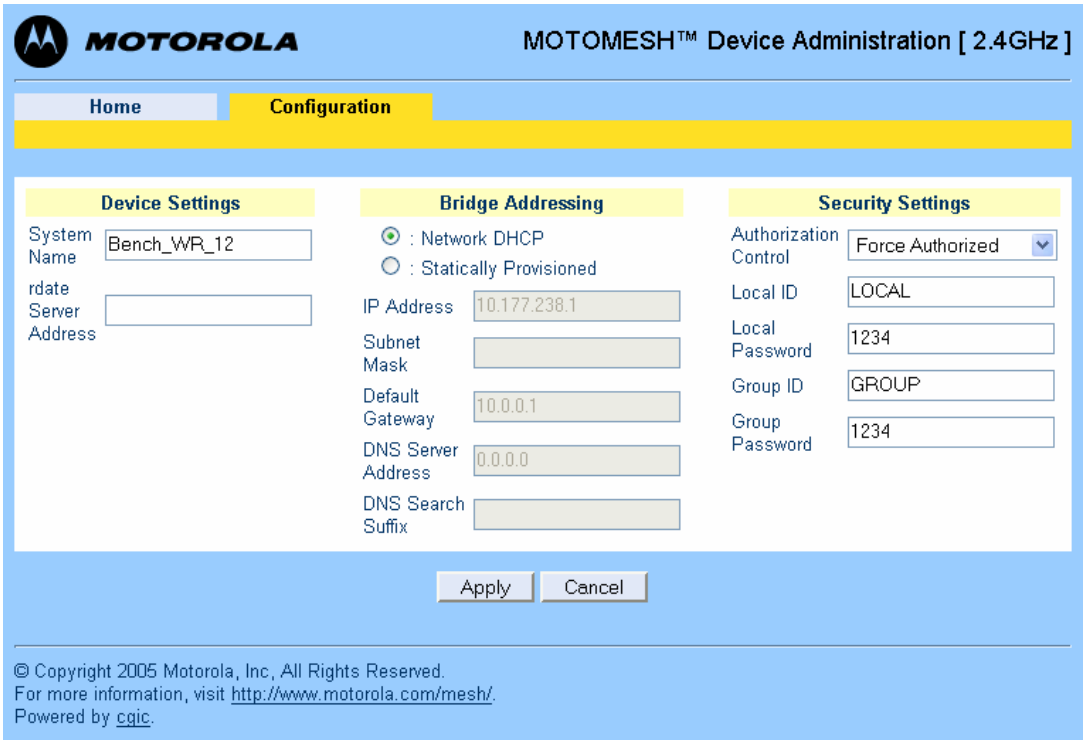
Once you have accessed the MOTOMESH Device Administration home page, click on the *Configuration* tab to display the IP address configuration.

The *MOTOMESH Device Administration Configuration* page when viewed as an Administrator (same as Super User Login) allows for changes to the device configuration.

Please note that the default **Bridge Addressing** scheme is set to **Network DHCP** and selecting the **Statically Provisioned** mode will allow for field entry into the previously inactive (grayed-out) fields in that section of the web page.

When making changes to the **Bridge Addressing** section be sure to select the **Apply** button to initiate the changes and then follow on-screen prompts to complete the process.

Figure 3-3 MOTOMESH Device Administration Configuration Page



The following sections describe the main section contents displayed in the *Configuration* tab of the device administration web interface.

Device Settings Section

Table 3-2 Device Settings Section (Configuration Tab)

Field Name	Field Description	Field Default Value
System Name	This is the name of the device as shown by MeshManager	Assigned by Network Administrator
RDATE Server IP Address	The IP address of the RDATE server. This is usually the MiSC when operating in infrastructure mode. The RDATE server provides the current date to the MWR. The MWR can operate without an RDATE server.	172.31.0.20

Bridge Addressing Section

Table 3-3 Bridge Addressing Section (Configuration Tab)

Field Name	Field Description	Field Default Value
Network DHCP **Or**	Use this setting to decide whether the device will get its IP address automatically from a **Network DHCP** server or use a fixed address provided manually by a Network	Network DHCP

Field Name	Field Description	Field Default Value
Statically Provisioned	Operator (Statically provisioned).	
IP Address	The IP address will be automatically provided by a DHCP server if one exists *and* the above field has been set to **Network DHCP**. If the setting has been set as **Statically Provisioned**, and not provided by the Network Operator, then it will be automatically hashed from the device's MAC Address.	Varies depending on the selection made in the field above.
Subnet Mask	This is the subnet mask for the local Ethernet segment.	blank
Default Gateway	The MWR will tell the attached Ethernet devices to use this address for the default gateway, and the MWR will use the address when accessing the local Ethernet segment.	Assigned by Network Administrator
DNS Server Address	The address of the local DNS Server.	Assigned by Network Administrator
DNS Search Suffix	The DNS search suffix provided by the Network Administrator.	blank

Additional Information about the Network DHCP Setting

Network DHCP means that the MWR device can be configured to request an address from a DHCP server and requires the inclusion of a DHCP server in the core network configuration to answer these requests. With Network DHCP selected, the MWR will send DHCP requests for its own address to the core network once it becomes associated and establishes communications with the infrastructure. Operation under the Network DHCP selection allows users to temporarily wander outside of the network infrastructure without losing connectivity.

The server may be configured by the operator to hand out temporary or static leases. The MWR must associate and acquire an address from the network before establishing communications. Once a lease has been granted, the address will be valid out of network coverage for the remainder of the lease or, if a static lease was granted, until the next power cycle. If the lease expires or the user cycles power while outside of network coverage, the user will again lose the ability to communicate with the wireless network.

Additional Information about the Statically Provisioned Setting

When selecting the **Statically Provisioned** *Bridge Addressing* option from the **Configuration** web page, the MWR device will use provisioned DHCP-like information to establish an IP address for use in the wireless network. A DHCP server is not required on the core network because the addresses are derived from the MAC address by default. It should be noted that a DHCP server can still exist on the network to hand out addresses to other nodes using the Network DHCP option as long as the server's address range does not conflict with addresses assigned to other devices using the Statically Provisioned option.

The IP addresses and options used are also configurable per-device using the MOTOMESH MeshManager application.

The Network Operator can choose to keep the provided (derived IP address) or assign a *fixed* IP address and subnet mask. It is up to the Network Operator to ensure that the assigned address is routable on the core network (if core network access is needed) and that it does not conflict with other addresses in use. This is analogous to and carries the same caveats as plugging an Ethernet card into a LAN and manually assigning an address to the card.

Security Settings Section (Authentication)

There are three security authentication settings available to the MOTOMESH MWR device: Force Authorized, Force Unauthorized, and Local. Security authentication modes are selected from within the **Security Settings** section of the MOTOMESH Device Administration Configuration page in the **Authorization Control** field

The table below describes each field within the **Security Settings** section.

Table 3-4 Device Web Interface - Security Settings Section (Configuration Tab)

Field Name	Field Description	Field Default Value
Authorization Control	To allow for various levels of security and authentication control, there are three security authentication settings available to the MOTOMESH MWR device: Force Authorized, Force Unauthorized, and Local.	Force Authorized
	Force Authorized: In Force Authorized mode, there are effectively no security and authentication controls, resulting in open authentication for all network devices. There will be no security measures applied to links between devices that are currently set to Force Authorized. Hardware authentication via the HAS is still performed but password authentication is not carried out at the user level and there is no integrity check carried out for all packets transferred between any source and destination node	
	Force Unauthorized: In Force Unauthorized mode, all devices seeking authorization for network access will be denied, effectively locking down the network. The Force Unauthorized setting will not allow any network device to establish communication with any other node that may attempt to communicate with the node set to Force Unauthorized.	
	Local: In Local mode, the User ID and password for all devices requesting network access must be validated against the security information configured at the IAP. If the password is not valid, access will be denied. If the password is valid, the device will be authorized for network access and a secure connection will be maintained for the duration of the association with the IAP. Integrity checking will be carried out on all the packets flowing between the source and destination node.	
Local ID	The specified Local ID is used for communication authentication with an Intelligent Access Point device (IAP).	Local
Local Password	The password used for authentication control between a local subscriber device and an IAP device.	blank

Field Name	Field Description	Field Default Value
Group ID	The specified Group ID is used for authentication control between local subscriber devices when communicating in peer-to-peer mode.	Group
Group Password	The password used between local subscriber devices that belong to the same assigned group and share the same password.	blank

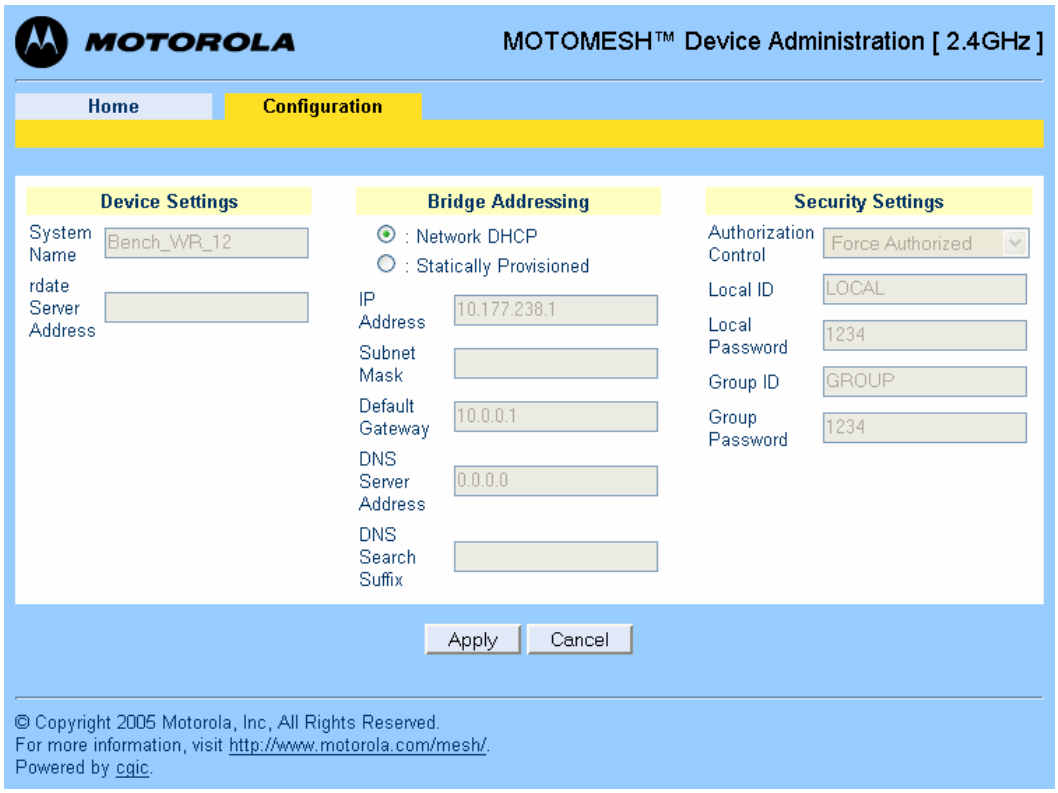
Viewing the MWR Configuration Page as a Normal User

When a Normal User logs into the Device Administration web interface, the Configuration page contents will be the same as when viewed by an administrator account. The only difference is that Normal users can *ONLY* change the **Bridge Addressing** scheme to **Statically Provisioned** and enter specific IP addresses if needed or requested by a Network Administrator.

Please note that the default addressing scheme is set to **Network DHCP** and selecting the **Statically Provisioned** mode will allow for field entry into the previously inactive (grayed-out) fields in that section of the web page.

When making changes to the **Bridge Addressing** section be sure to select the **Apply** button to initiate the changes and then follow on-screen prompts to complete the process.

Figure 3-4 MWR Configuration Page (Normal User Account)



Chapter

4

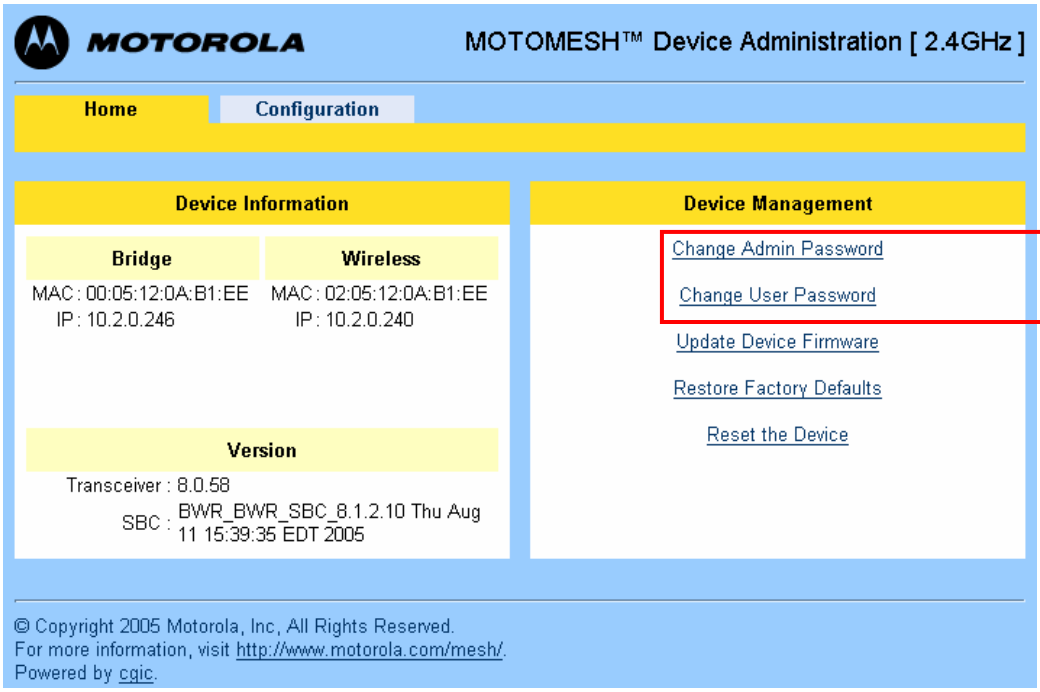
Chapter 4: Device Maintenance

This chapter describes the available device maintenance functions through the use of the MWRs local web interface.

Changing the Web Interface Password

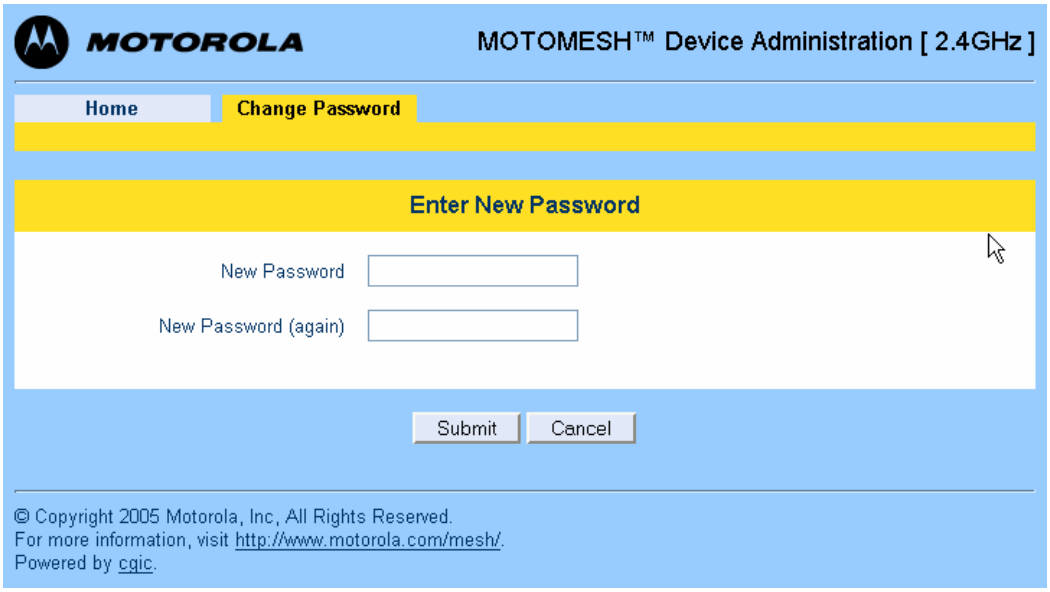
For security reasons it is important to change the Administration password at your earliest convenience. To change an Administration or User Password, select the *Change Admin Password* or the *Change User Password* option from the *MWR Device Administration* Home Page. The device will present the following web page.

Figure 4-1 Select Change Admin Password



The new password will be stored in flash, and the device will present a status screen indicating that the change was successful.

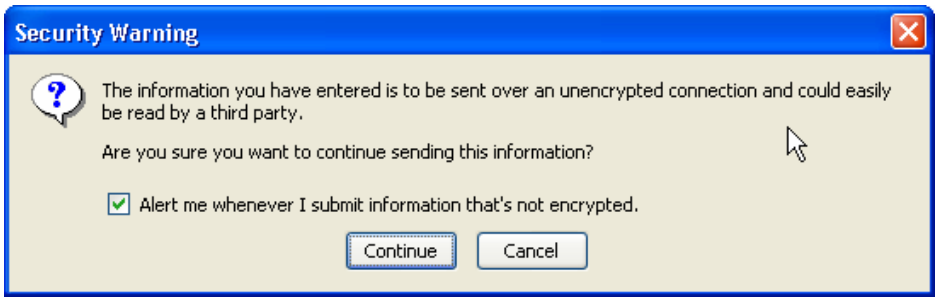
Figure 4-2 Enter New Password Screen



Enter a new password for the web administrator account and click on the **Submit** button.

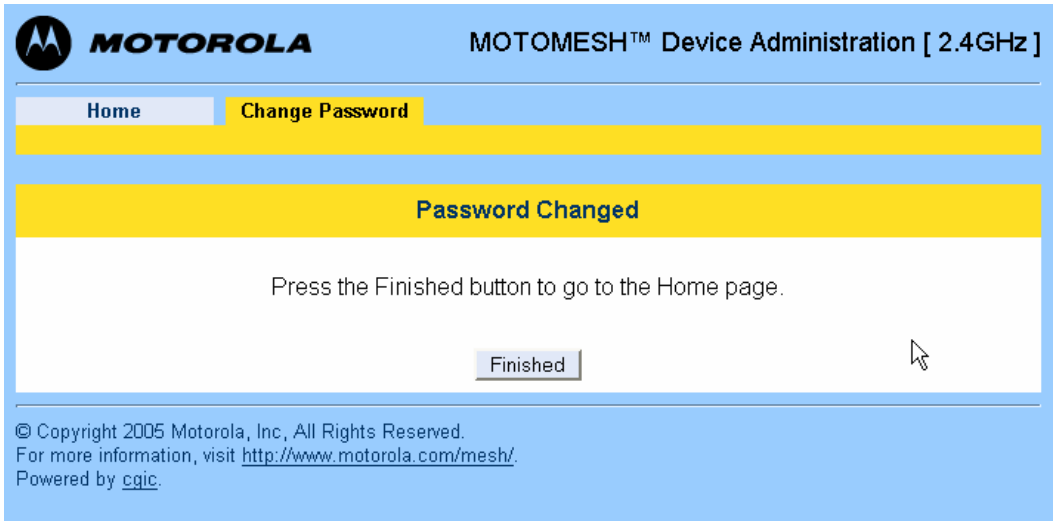
After the new password entry has been submitted, the device will prompt the operator to **Continue** with the process.

Figure 4-3 Password Changed Confirmation



From the *Password Changed* screen select the **Finished** button to return to **Home** page.

Figure 4-4 Password Change Completed

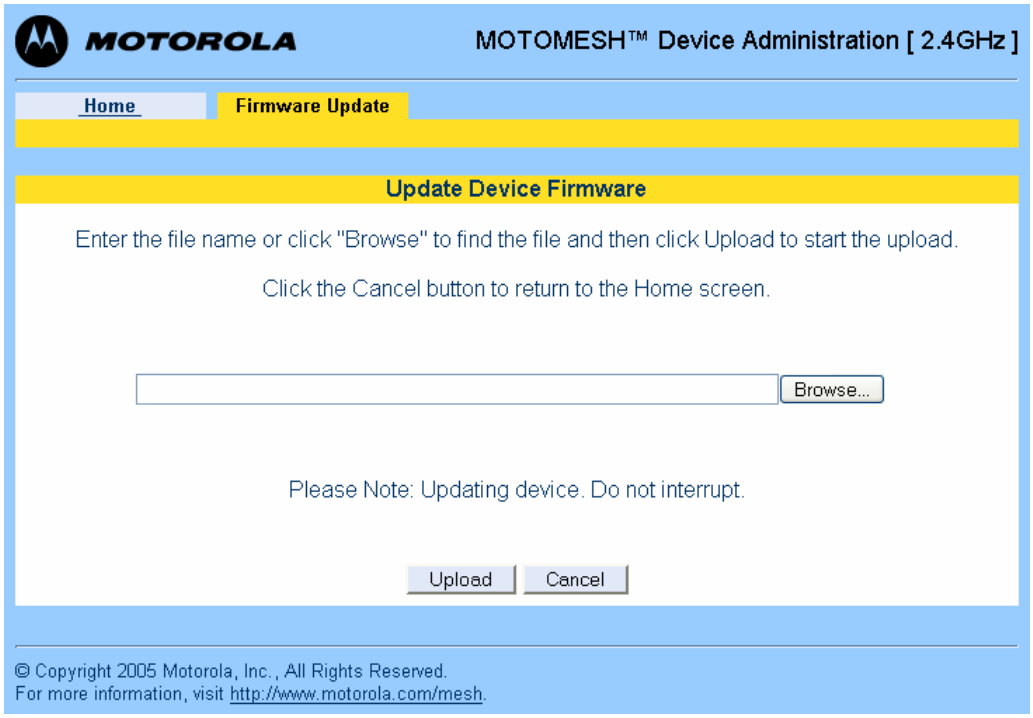


Updating the Device Firmware

The web interface for the device also provides the ability to update the firmware on-site. To use this feature, you must have an upgrade file from a released upgrade package.

When the *Update Device Firmware* function is selected from the *MOTOMESH Device Administration* home page, the device will present the following web page:

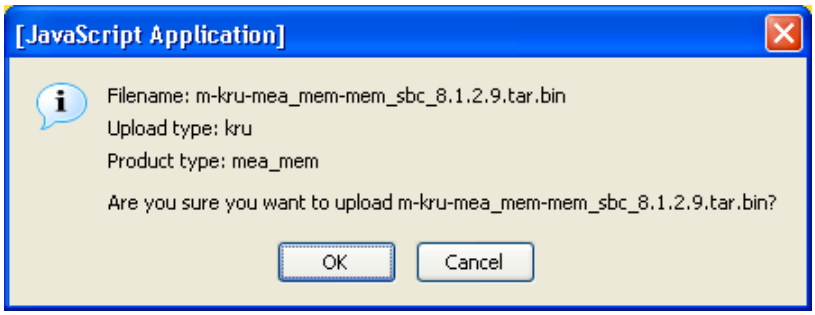
Figure 4-5 Update Device Firmware Web Page



Entered the correct filename and select the **Upload** button to initiate the device firmware update.

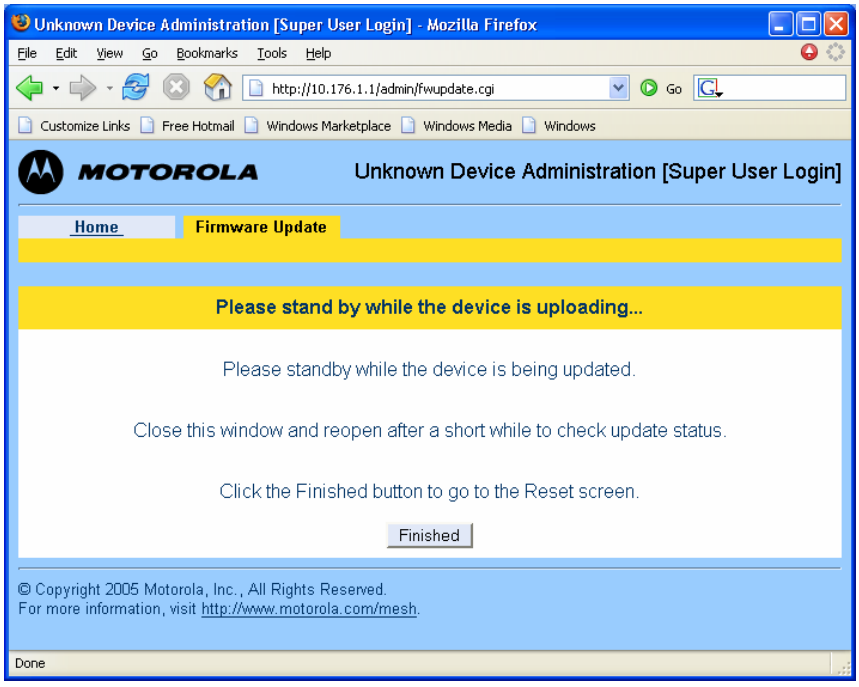
When the device will prompt for firmware filename selection confirmation, select the **OK** button to continue with the update process. The filename shown in the figure below is only an example; the actual file name will be different.

Figure 4-6 Confirm Upload Window for Firmware Update



When the filename has been confirmed, the web browser will transmit the file to the device, and the device will present an upgrade progress screen. This page will indicate the current stage in the upgrade process.

Figure 4-7 Firmware Upload Progress Web Page



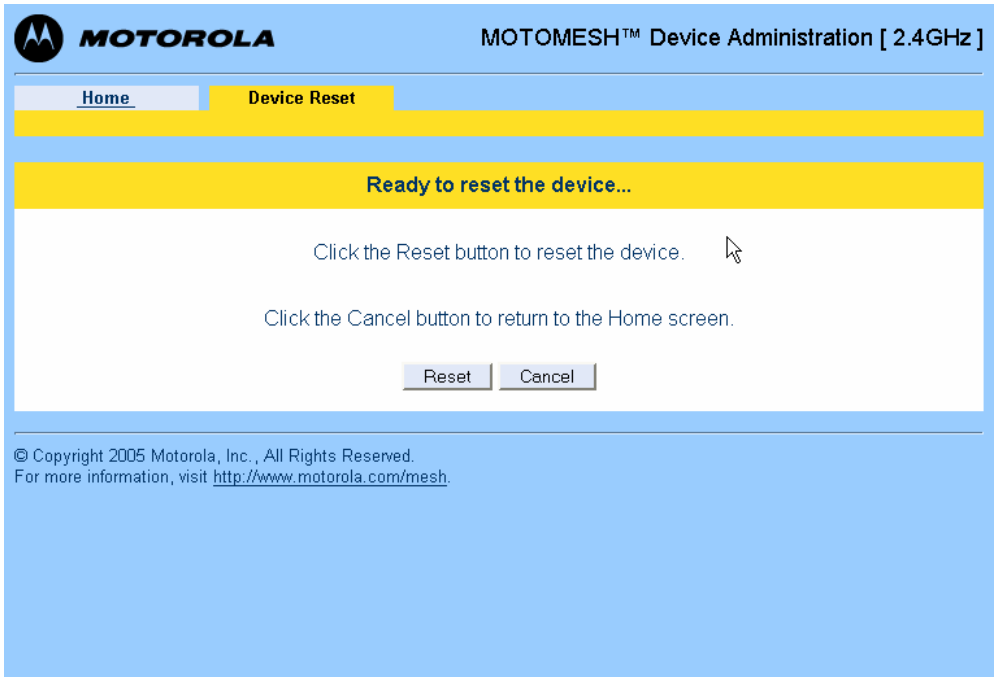
Once the upgrade is completed, the device must be reset. The *Finished* button will transition the web browser to the reset screen. See the Resetting the MWR via the Device Web Page section in this manual for additional information.

Resetting the MWR via the Device Web Page

Although you should not have to reset the MWR device, the device can be reset via the device administration web interface. In order to reset the device, return to the *MOTOMESH Device Administration* Home page, and choose the *Reset the Device* selection.

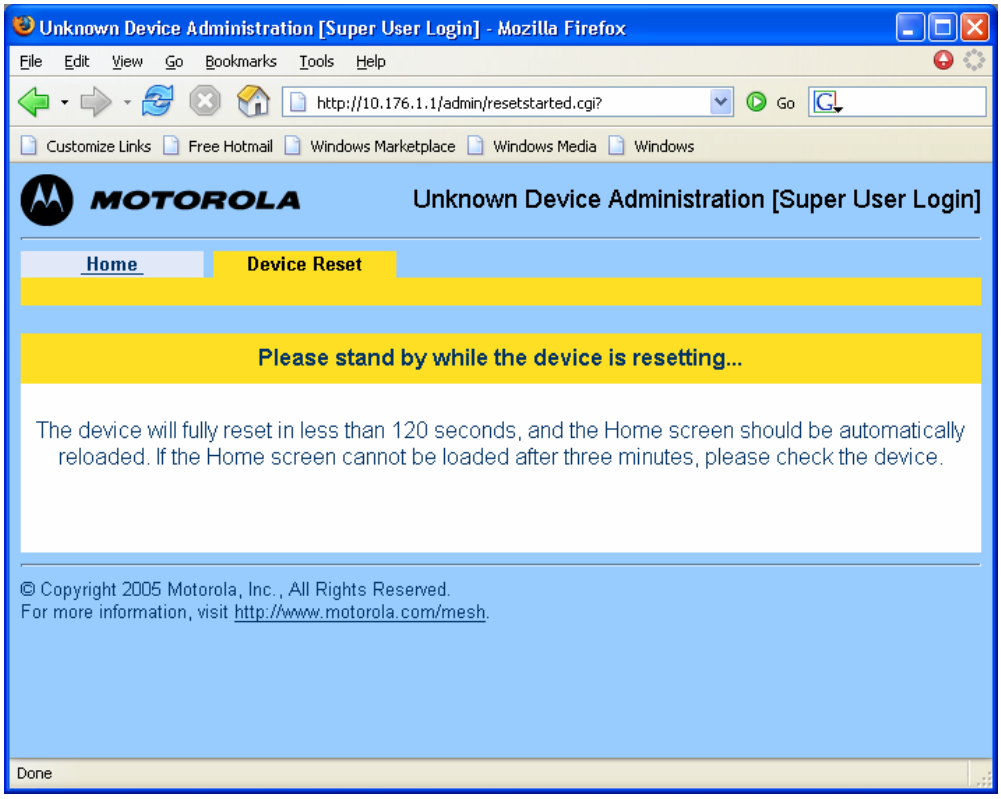
The web page displayed will allow you to reset the device. Select the **Reset** button to initiate the reset process.

Figure 4-8 Device Reset Prompt Web Page



When you have reset the device, the following screen will be displayed. Your browser will delay for a short time, then transition to the home page once more.

Figure 4-9 Device Reset in Progress Page



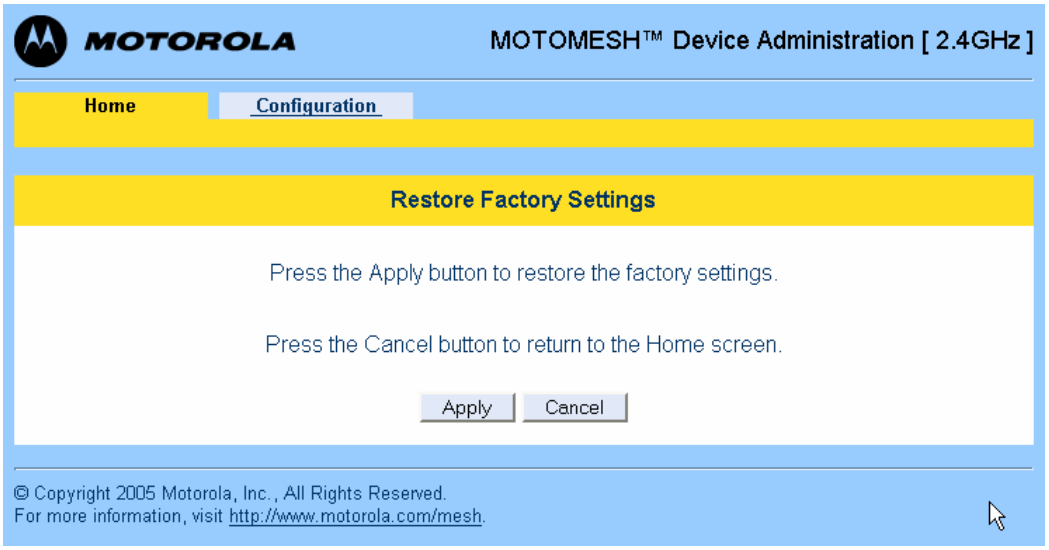
NOTE: After the completion of the reset, you may experience a slight delay when bringing up another web page. Be patient.

Restoring Factory Settings

When the *Restore Factory Defaults* function is selected from the *MWR Device Administration* Home Page, the device will present the following web page.

Select the **Apply** button to initiate restoring the factory settings on the device.

Figure 4-10 Restore Factory Settings Web Page



The *Restore Factory Defaults* function will allow you to return the device to factory defaults. This change will include the web password for the administrator and access accounts. This will also return the local IP addresses to the default MAC-derived values.

The confirmation window will be displayed. Click on the **OK** button to confirm the action.

Figure 4-11 Confirm Changes Window for Restore Factory Settings

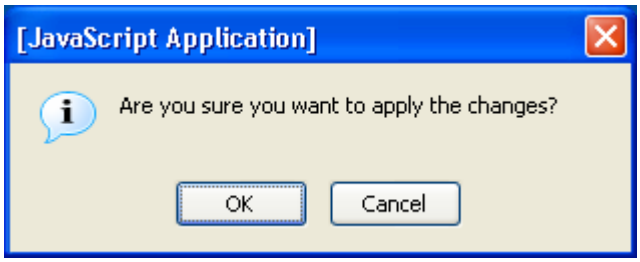
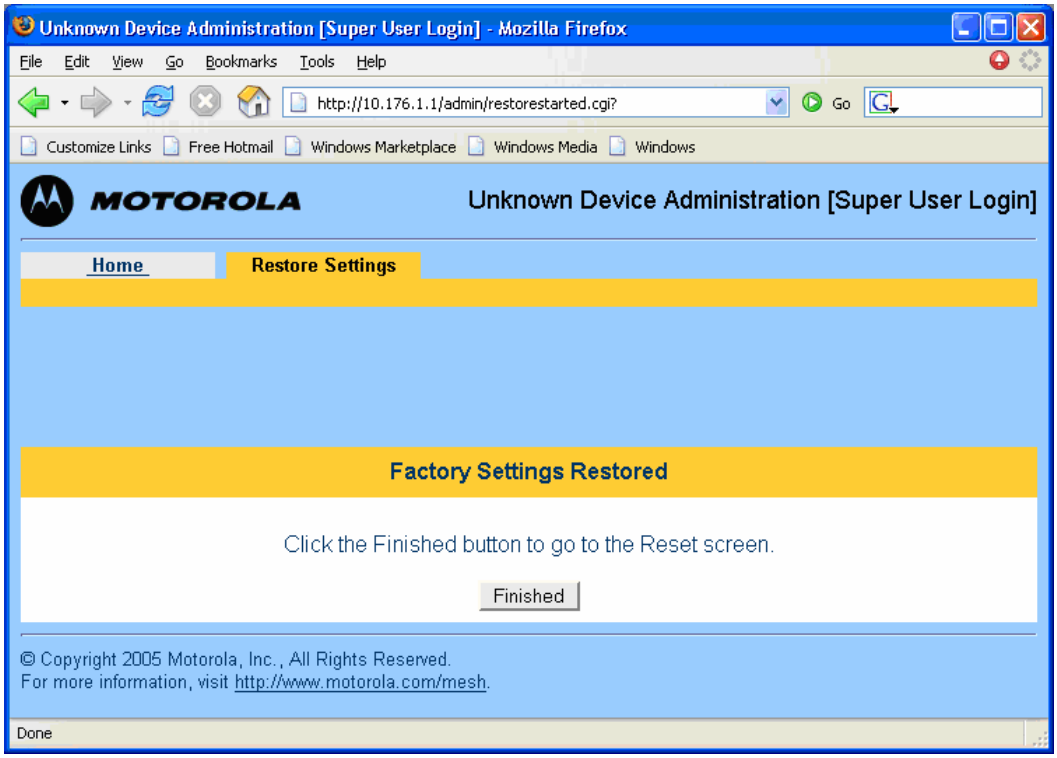
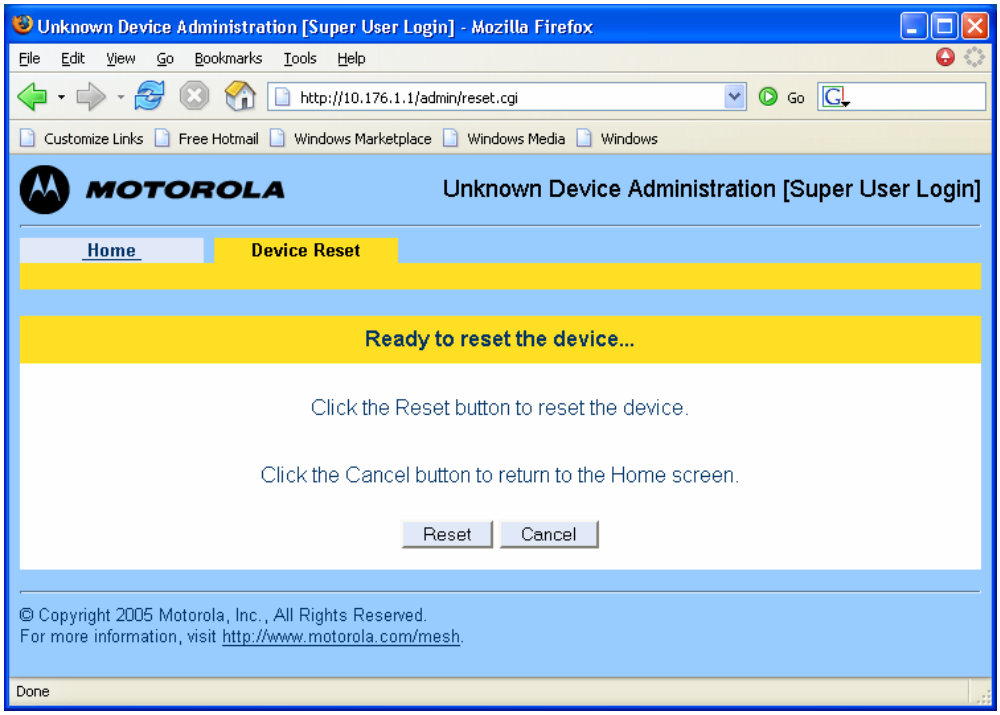


Figure 4-12 Factory Settings Restored Web Page



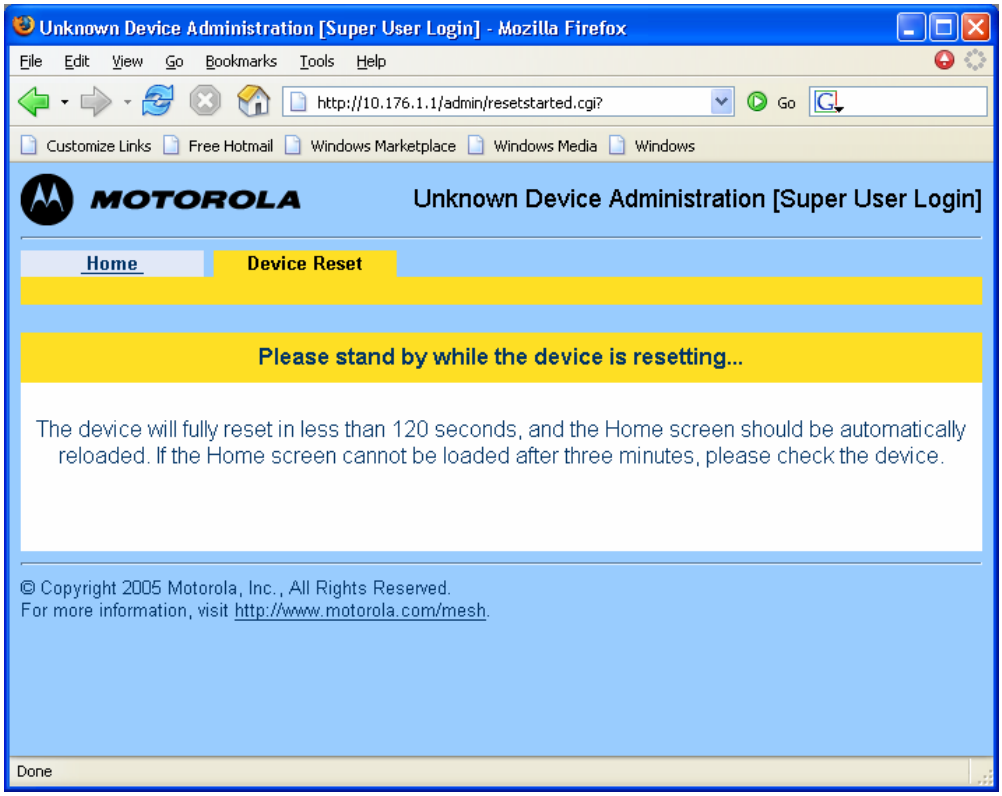
Click on the **Finished** button to continue to the **Reset** page.

Figure 4-13 Ready to Reset Device Web Page



Select the **Reset** button to initiate resetting the device.

Figure 4-14 Resetting Device Web Page



When the device has finished resetting, the web page will update to the Device Administration Home page.

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Chapter

5

Chapter 5: Customer Information

This chapter provides information about how to obtain customer service support from Motorola and describes the type of information you should have available prior to making the support call.

Customer Service Information

If you have read this document and made every effort to resolve installation or operation issues yourself and still require help, please contact Motorola System Support Center (SSC) using the following contact information:

Hours of Operation

7 days a week, 24 hours

Technical Support: 800-221-7144 (USA)

Obtaining Support

Motorola provides technical support services for your system and recommends that you coordinate warranty and repair activities through the Motorola System Support Center (SSC). When you consult the Motorola SSC, you increase the likelihood that problems are rectified in a timely fashion and that warranty requirements are satisfied. Check your contract for specific warranty and service information.

System Information

To be provided with the best possible opportunity for support, collect the following system information and have it available when obtaining support.

- Location of the system
- Date the system was put into service

- Software or firmware version information for components of your system
- Serial number(s) of the device(s) or component(s) requiring support
- A written description of the symptom or observation of the problem:

  - When did it first appear?

  - Can it be reproduced?

  - What is the step-by-step procedure to cause it?
- Do other circumstances contribute to the problem? For example, changes in weather or other conditions?
- Maintenance action preceding problem:

  - Upgrade of software or equipment

  - Change in the hardware or software configuration

  - Software reload - from backup or from CD-ROM (note the version and date)

Return Material Request

After collecting system information, contact the Motorola System Support Center for assistance or to obtain a Return Material Authorization (RMA) number for faulty Field Replaceable Entities (FREs):

North America: 800-221-7144

Radio Products and Services Division

The Radio Products and Services Division is your source for manuals and replacement parts.

Radio Products and Services Division Telephone Numbers

The telephone numbers for ordering are: (800)-422-4210 (US and Canada orders)

The fax numbers are: (800)-622–6210 (US and Canada orders)

The number for help identifying an item or part number is (800)-422-4210; select choice “3” from the menu

Returning System Components to Motorola

Motorola's service philosophy is based on field replaceable entities (FREs). FREs are system components identified by Motorola to be returned to Motorola for repair. In turn, Motorola sends you a replacement FRE component to help you maintain maximum operating performance for your system.

Returning FREs

Return faulty FREs to Motorola for repair. When you return an assembly for service, follow these best practices:

- Place any assembly containing CMOS devices in a static-proof bag or container for shipment.
- Obtain a return authorization (RA) number from the Motorola System Support Center.
- Include the warranty, model, kit numbers, and serial numbers on the job ticket, as necessary.
- If the warranty is out of date, you must have a purchase order.
- Print the return address clearly, in block letters.
- Provide a phone number where your repair technician can be reached.
- Include the contact person's name for return.
- Pack the assembly tightly and securely, preferably in its original shipping container.

Chapter

6

Chapter 6: Certification and Safety Information

This chapter lists the relevant FCC Certification and Product Safety Information for the MOTOMESH devices described in this manual.

FCC Regulatory Information

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.

The MWR7300 requires professional installation to ensure the installation is performed in accordance with FCC licensing regulations.

Federal Communications Commission (FCC) Statement:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Any changes or modifications not expressly approved by Motorola could void the user's authority to operate the equipment.

FCC RF 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 minimum distance 2 meters between the radiator and your body.

Safety Information for the MOTOMESH Products

The Federal Communications Commission (FCC) with its action in ET Docket 96-8 has adopted a safety standard for human exposure to radio frequency (RF) electromagnetic energy emitted by FCC certified equipment. Motorola MOTOMESH products meet the uncontrolled environmental limits found in OET-65 and ANSI C95.1, 1991. Proper operation of this radio according to the instructions found in this manual and the hardware and software guides on the MOTOMESH CD will result in user exposure that is substantially below the FCC recommended limits.

- Do not touch or move the antenna(s) while the unit is transmitting or receiving.
- Do not hold any component containing a radio such that the antenna is very close to or touching any exposed parts of the body, especially the face or eyes, while transmitting.
- Do not operate a portable transmitter near unshielded blasting caps or in an explosive environment unless it is a type especially qualified for such use.
- Do not operate the radio or attempt to transmit data unless the antenna is connected; otherwise, the radio may be damaged.

Safety Certification

Conforms to UL STD ANSI/UL 60950 3rd Edition

Certified to CAN/CSA C22.2 NO. 60950-00

Equipment shall be suitable for use in Air pressure: 86kPa to106kPa.

Index

Glossary

IAP – Intelligent Access Point

MEA – Mesh Enabled Architecture

MiSC – Mobile Internet Switching Controller

SBC – Single Board Computer

SD – Subscriber Device, a general description to a device type that is usually a WMC or a MWR.

MWR– Vehicle Mounted Modem

WMC – Wireless Modem Card, can apply to any model number

WR – Wireless Router