RapidHA Lighting Features Tutorial V0.1

Creating RapidHA Lighting Feature Demo
RapidConnect Hardware and RapidHA Desktop

August 22, 2016

Revision History

Version	Date	Modified By	Comments
0.1	**Aug 16 2016**	L. Tutty	First Draft

Table of Contents

1   Introduction

1.1   Overview

This document provides testing instruction for RapidHA Lighting functionality. Please follow these instructions to exercise RapidHA Lighting using the RapidHA Desktop.

1.2   Definitions of Terms and Acronyms

Attribute: A representation of a setting/state or physical quantity. These are modified or communicated through commands.

Cluster: A set of related attributes or commands. Some clusters are deemed to be mandatory for certain devices in order to achieve certification under a given ZigBee Application Profile.

HA: Home Automation. ZigBee Home Automation is an application profile comprising the mandatory features necessary for specified classes of home automation devices such as lights, HVAC systems, alarm systems, window shades, or door locks.

Host: The Host application or integrating device exercising RapidHA Lighting Devices.

IP: Intellectual Property

MSE: Manufacturer Specific Extension. This is an additional set of attributes/commands that are not defined in the ZCL, but are implemented by a manufacturer through custom development.

Module: The hardware platform running the RapidHA Lighting Devices application; also used as shorthand for the RapidHA Lighting applications themselves in relation to their interactions with the Host, i.e. serial data transmitted from the Module to the Host, or vice versa.

RapidHA: MMB Networks' ZigBee Home Automation Platform

ZCL: ZigBee Cluster Library. A list of standardized clusters accepted by the ZigBee Alliance.

1.3   References

References may be made to the following:

- ZigBee Smart Energy Profile Specification Revision 16 [DOC3]
- ZigBee Home Automation Profile v1.2 Specification Revision 29 [DOC4]
- ZigBee Cluster Library Specification Revision 4 [DOC5]

2   System Requirements

For successful operation of the software, the following is required:
- PC running Windows 7 or later
- Java version 7 or later – the RapidHA Desktop software will provide a link to the correct Java download page if it is not found on the system. A PC running a 64--bit operating system requires 64--bit Java.

Hidden files/folders set to be visible in Windows explorer. Instructions on how to enable this setting can be found here: http://windows.microsoft.com/en--ca/windows/show--hidden--files#show--hidden--files=windows--7
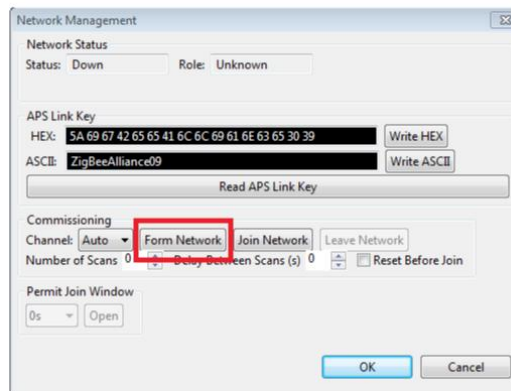
3   Forming a ZigBee Network(Coordinator)

Note: The instructions will assume that RapidConnect USB Sticks are being used, but RapidConnect Development Boards can be substituted for the USB sticks and the process will be unchanged, as long as the Windows driver for the Development Board has also been installed. The term *RapidConnect USB Stick* will be used hereafter.

1. Download the RapidConnect USB Stick Driver from the MMB Networks Downloads Page. Unzip the package and install the 32 or 64--bit version of the driver, matching the Operating System version (i.e. 32--bit driver for a 32--bit Operating System).
2. Choose a RapidConnect USB stick to serve as the **Coordinator** and plug it into the computer.
3. Download and launch the RapidHA Desktop installer from the MMB Networks Downloads Page.
4. Once installed, launch the RapidHA Desktop software. Select the COM port corresponding to the RapidConnect USB stick and click Open. If this is the first time the RapidConnect USB stick has been used, the Device Configuration window will automatically open. If it does not, click Config.
5. Configure the RapidConnect USB Stick to serve as a Coordinator by completing the following actions:

a.   Click 'Enter configuration Mode' and then 'Select and Configure Device'

b.   Navigate to "C:\Users\<username>\AppData\Local\Apps\MMB Networks\RapidHA\config"

c.   Select "coordinator.xml" and click OK
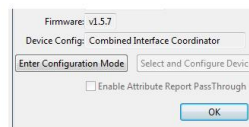
6. Form a ZigBee network by clicking on the **Manage** button and then clicking **Form Network**.

7. Select a **Permit Join Window** duration from the drop--down box and then click **Open**. Click **OK.**
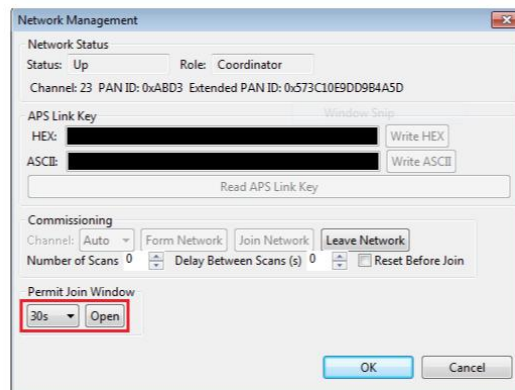
8. The **Coordinator** will now permit other devices to join the ZigBee network for the length of time selected in the Permit Join Window drop--down box. A timer at the bottom of the screen will display the amount of time remaining in the Permit Join Window. If the timer reaches 0s, Permit Join can be enabled again by clicking the **Manage** button and repeating Step 7.
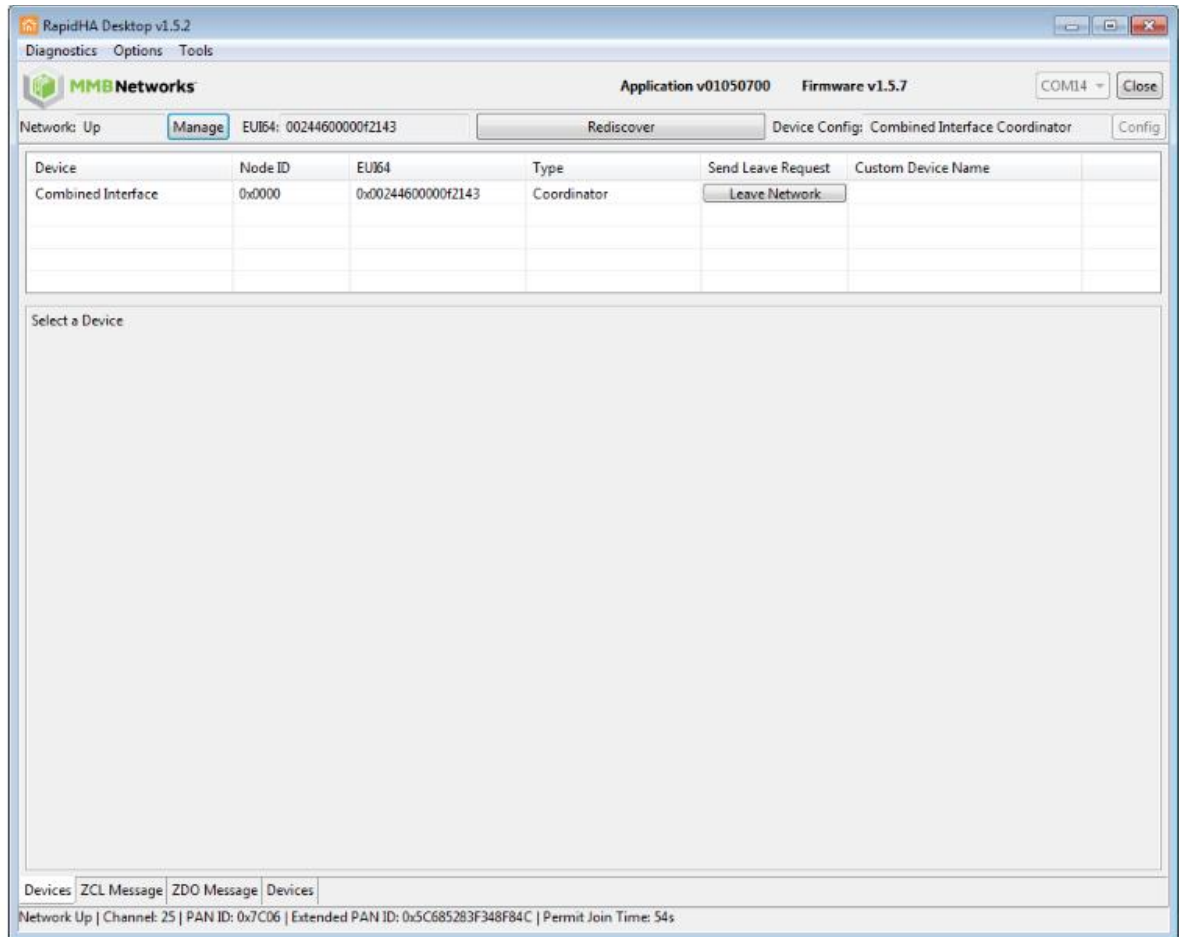
## 4   Testing RapidHA Lighting Features

The following instructions will explain the process of using a **RapidHA Lighting Device** and joining the network that was formed in the previous section. The instructions will require the user to run two instances of RapidHA Desktop; one for a Coordinator and one for a **RapidHA Lighting Device**. The instances can be identified by the value that is displayed next to Device Config at the top right corner of the RapidHA Desktop window.

Once you have loaded **RapidHA Lighting** firmware on some MMB hardware, that hardware will be automatically be configured as a Level Controllable Output device. Upon powering on, it will join the network automatically, as long as you have permitted joining on the coordinator as shown above in **Step 7**. The following instructions can then be used to send Level Control commands from the coordinator:

Choose '**Dimmable Light**' (RapidHA Lighting Device) from the device table within the RapidHA Desktop software.
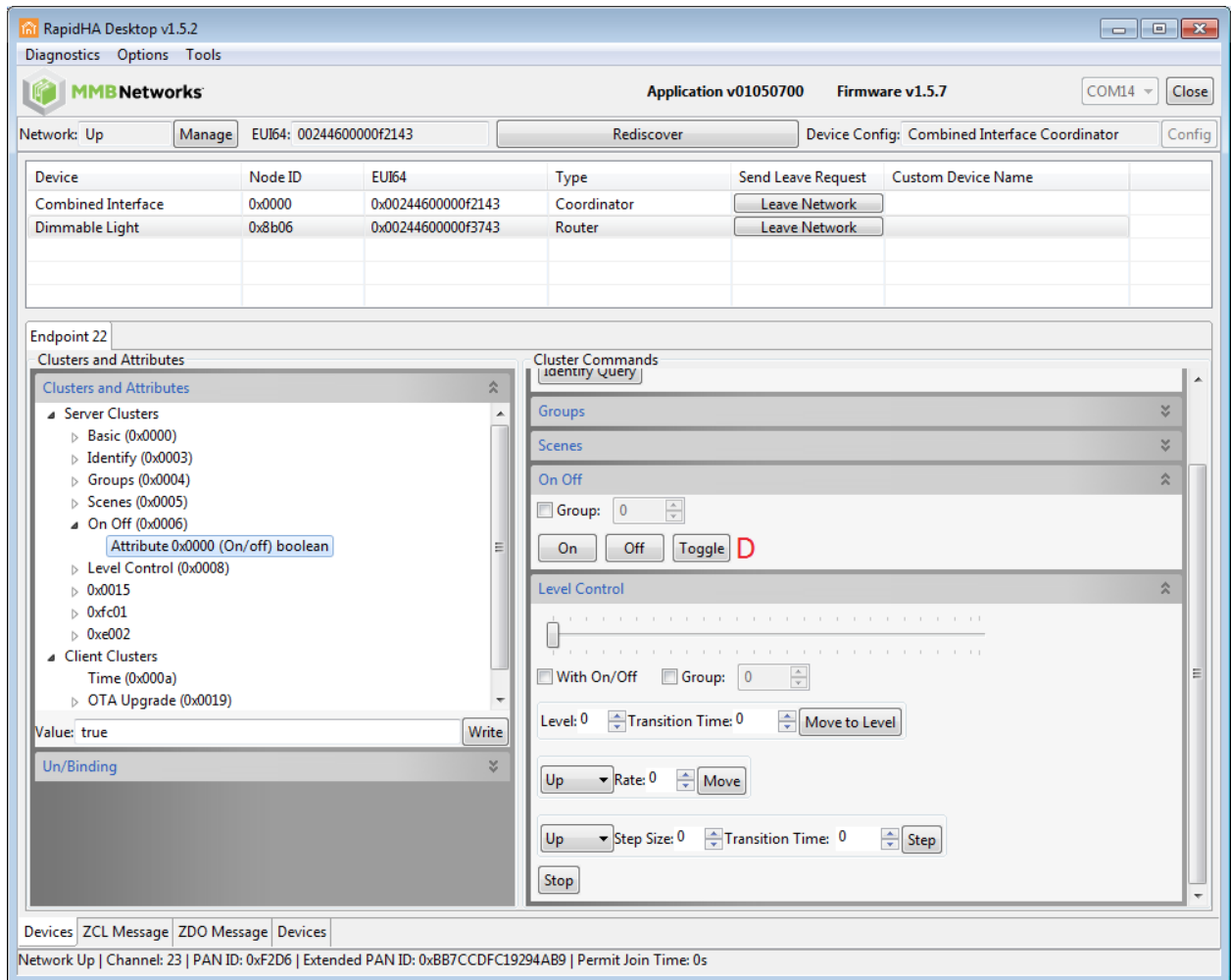
- **Dimming Features**
  - o   Under **'Endpoint 1'**, the Level Control cluster displays the Current Level attribute when the cluster is expanded. The Current Level value ranges from 0 to 255, with 0 representing a 0% duty cycle and 255 representing a 100% duty cycle for the PWM signal.

- o Each time the PWM signal is adjusted, it will be necessary to manually refresh the RapidHA Desktop software to see an updated **Current Level** value.
- o The slider can be used to increase or decrease the **Current Level.**
- o From the image below, the feature outlined next to the letter **"A"** in red can be used to manually set the level value. For example, to set the value accurately to 100 without using the slider, the user can enter that value in **"Level"** and press **"Move to Level"**
- o Point **"B"** from the image below moves the Current Level higher or lower (up or down) in increments. When the user presses **"Move"**, it can be observed that the Current Level changes by the increment value specified. For example, if the user enters the rate to be 10 and the Current Level reads 50 (and the mode is specified to be up), then when the user presses **"Move",** the Current Level will increase by 10 every second. To end the move, the user must click **"Stop"**
- o Point **"C"** defines a step feature with a time transition. It is very similar to Point **"B"** (specified in the bullet above) but changes the rate with a time delay. Once again, the user would use the **"Stop"** button to eliminate this time step rate.
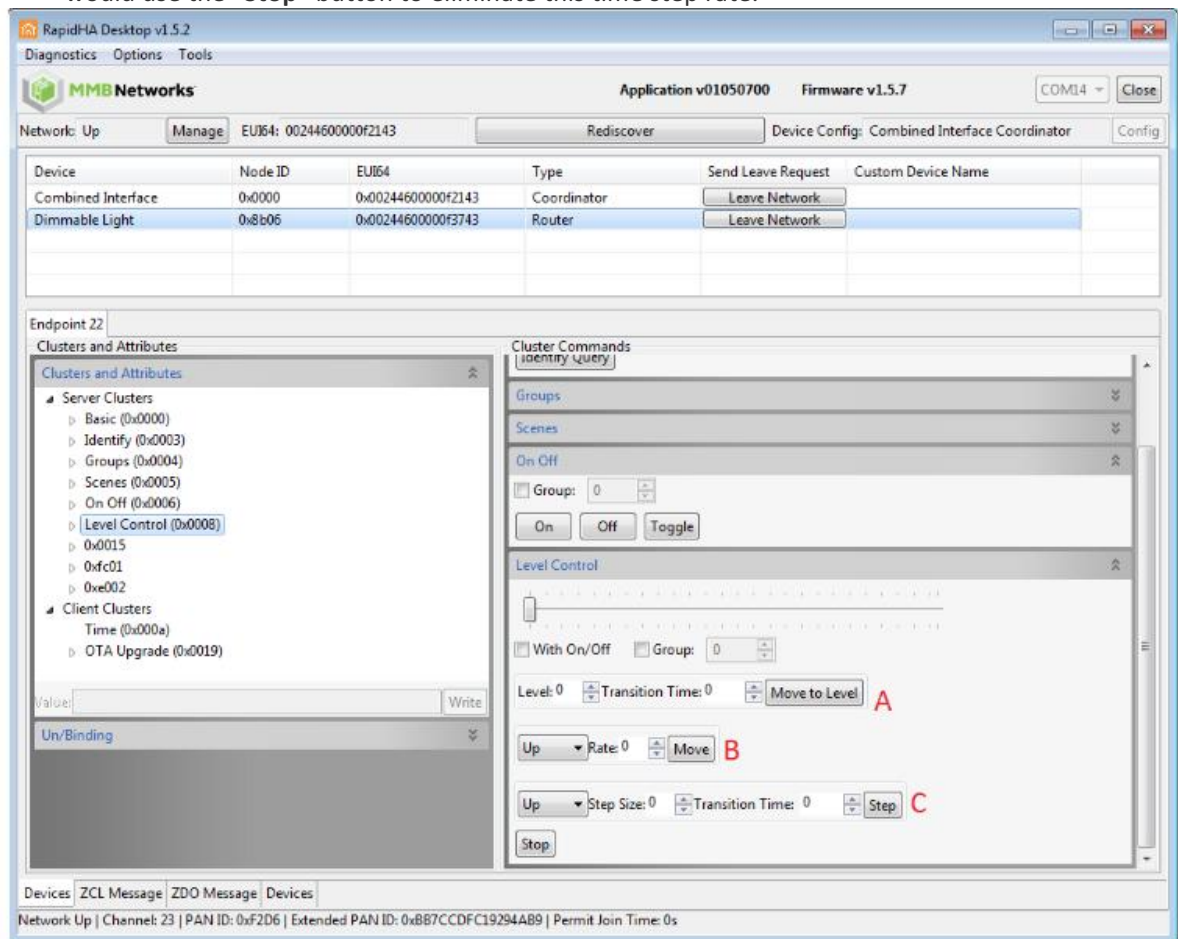
- **On/Off Features**
    - o Under **'Endpoint 1'**, the **On Off** cluster displays the Current on off status attribute when the cluster is expanded. The on off status is a boolean and can be either true or false.
    - o Point **"D"** shown in the image allows the user to either set the power state of the device to **'ON', 'OFF'** or '**Toggle'** between on and off.

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