

# RapidHA Desktop Startup Guide v0.2

Creating a ZigBee HA 1.2 Demo Using RapidConnect Hardware and RapidHA Desktop January 13, 2015

**MMB Networks** 

500-243 College Street Toronto, Ontario, Canada M5T 1R5 (416) 636-3145

## **Revision History**

Version	Date	Modified By	Comments
0.1	Sept 26, 2014	D. Alguire	First Draft
0.2	Jan 13, 2015	D. Alguire	Inserting generic references



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#### **1** 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: <u>http://windows.microsoft.com/en-ca/windows/show-hidden-files#show-hidden-files=windows-7</u>

## 2 Forming a ZigBee Network

The following instructions will outline how to use the MMB RapidConnect Development Kit to perform a simple ZigBee Home Automation (HA) 1.2 demo.

\*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.

- 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:
  - Click Select
  - Navigate to "C:\Users\<username>\AppData\Local\Apps\MMB Networks\RapidHA\config"
  - Select "coordinator.xml" and click OK

Device Configurat	ion
EUI64:	00244600000f006f
Firmware:	v1.2.0
Device Config:	Select
	ок

6) Form a ZigBee network by clicking on the **Manage** button and then clicking **Form Network**.

Network Management	×
Network Status Status: Down Role: Unknown	
APS Link Key	
HEX: 5A 69 67 42 65 65 41 6C 6C 69 61 6E 63 65 30 39 Write HEX	
ASCII: ZigBeeAlliance09 Write ASCII	
Read APS Link Key	
Commissioning Channel: Auto - Form Network Ioin Network Leave Network	
Permit Join Window Os  Open	
OK Cance	!

7) Select a **Permit Join Window** from the drop-down box and then click **Open**. Then click **OK**.

Network Management	×
Network Status       Role:       Coordinator         Status:       Up       Role:       Coordinator         Channel:       22       PAN ID:       0x8685       Extended PAN ID:       0xDAAF2378EEC6351E	
APS Link Key HEX: Write HEX ASCII: Write ASCII	
Read APS Link Key	
Commissioning Channel: Auto  Form Network Join Network Leave Network	
Permit Join Window 30s Open 0s 15s	
60s	

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 **Os**, Permit Join can be enabled again by clicking the **Manage** button and repeating Step 7.



RapidHA Desktop v1.2.6							• <mark>- X-</mark>
				Firmware	v1.2.0	COM22 -	Close
Network: Up Manage	EUI64: 002446000	000f147a	Rediscove	Device Config	Combined Interface Coo	ordinator	Config
Device	Node ID	EUI64	Туре		Send Leave Request	Custom Dev	ice Nam
Combined Interface	0x0000	0x00244600000f147a	Coor	dinator	Leave Network	)	
•							•
Select a Device							
Devices ZCI Mercage ZDO Merc	200						
Network Up   Channel: 11   PAN ID:	0xC2DE   Extended	PAN ID: 0xCF8A6DF2	18A616 <mark>96   Pe</mark>	rmit Join Time: 26s	1		

## 3 Simulating a ZigBee Device Using RapidConnect Hardware

The following instructions will explain the process of using a RapidConnect USB Stick to simulate a Door Lock and join the network that was formed in the previous section. The Door Lock Device Type was chosen for illustration purposes – other Device Types can be simulated by choosing the appropriate xml configuration files. The instructions will require the user to run two instances of RapidHA Desktop; one for a **Coordinator** and one for a **Door Lock**. 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.

- 1) 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 Configuration Window will automatically open. If it does not, click **Config**.
- 2) Configure the RapidConnect USB Stick to serve as a **Door Lock** by completing the following actions:
  - Click Select
  - Navigate to "C:\Users\<username>\AppData\Local\Apps\MMB Networks\RapidHA\config"
  - Select "doorlock.xml" and click OK



Device Configura	tion	
EUI64:	ро2446000009ь905	
Firmware:	v1.2.0	
Device Config:	Door Lock	Select
		ок

- 3) Now the simulated Door Lock device is ready to join a ZigBee network. Open the Coordinator instance of RapidHA Desktop and ensure that Permit Join is enabled, as detailed in Step 7 of the "Forming a ZigBee Network" section.
- 4) Return to the **Door Lock** instance of RapidHA Desktop and click **Manage**.
- 5) Click Join Network, then click OK.
- 6) The Device Table should now display two devices. After the devices complete Service Discovery, they should be labeled as a **Door Lock** and a **Combined Interface**.

n RapidHA Desktop v1.2.6						
Diagnostics Options Tools						
MMB Networks				Firmware v	L.2.0	COM23 🔻 Close
Network: Up Manage	EUI64: 00244600	0009b905	Rediscover	Device Config: I	Door Lock	Config
Device	Node ID	EUI64	Туре		Send Leave Request	Custom Device Nam
Door Lock	0xb6f2	0x002446000009b90	5 Router		Leave Network	]
Discovering	0x0000	0x00244600000f147a	Coordin	ator	Leave Network	J
•					1	•
Select a Device						
Secto Device						
Devices ZCL Message ZDO Mes	sage					
Network Up   Channel: 11   PAN IE	): 0xC2DE   Extended	d PAN ID: 0xCF8A6DF2	218A61696   Perm	it Join Time: 0s		

## 4 Sending Commands to ZigBee Devices

There are two ways to configure devices using RapidHA desktop:

I. Over the ZigBee network, by writing attribute values or sending commands.



II. Locally, by sending serial commands via USB from the PC connected to the RapidConnect hardware.

The following instructions will explain each of these methods for configuring devices.

#### 4.1 Sending commands over the ZigBee network

- 1) Open the **Coordinator** instance of RapidHA Desktop (i.e. the instance that displays the **Combined Interface Coordinator** configuration).
- 2) In the **Device Table**, click on the **Door Lock** device. This will open the **Door Lock** device interface.

🟫 RapidHA Desktop v1.2.6							×
Diagnostics Options Tools							
				Firmware v	1.2.0	COM22 🔻	Close
Network: Up Manage	EUI64: 0024460	0000f147a	Rediscover	Device Config:	Combined Interface Coo	ordinator	Config
Device	Node ID	EUI64	Туре		Send Leave Request	Custom Devic	e Nam
Combined Interface	0x0000	0x00244600000f147a	Coordina	ator	Leave Network	)	
Door Lock	0xb6f2	0x002446000009b905	6 Router		Leave Network		
•							-
Endpoint 1							
Clusters and Attributes		Cluster	Commands				
<ul> <li>Basic (0x0000)</li> </ul>		Identif	fy			2	1 Al
Identify (0x0003)		Ident	ify 60 🌲 s	seconds			
b Groups (0x0004)							
Scenes (0x0005)		Ident	ify Query				
<ul> <li>Door Lock (0x0101)</li> <li>Client Clusters</li> </ul>		Group	s				: =
Time (0x000a)		Scene	s			2	;
> OTA Upgrade (0x0019)		Doorl	.ock			2	
		Lock/	Unlock				
		Get	Lock State: Unk	nown			
		Con	nmands				
Value:		Write	k Unlock To	ggle			-
Devices ZCL Message ZDO Mess	age			_			
Network Up   Channel: 11   PAN ID:	0xC2DE   Extend	ed PAN ID: 0xCF8A6DF2	18A61696   Permi	t Join Time: 0s			

- 9) Under the **Cluster Commands** listed on the right side, click on the **Door Lock** interface to expand it. This interface will provide facilities for issuing commands to manipulate the Door Dock.
- 10) The **Get Lock State** button can be used to query the current state of the lock (i.e. **Locked** or **Unlocked**).
- 11) The Lock and Unlock buttons will send commands to change the state of the simulated Door Lock. These state updates will be reflected in the Door Lock instance of the RapidHA Desktop software:



RapidHA Desktop v1.2.6	j				83	RapidHA Desktop v1.2.6			
MMB Networks	S.		Firmware v1.2.0	COM23 👻 CI	lose	MMBNetworks		Firmware	e v1.2.0
Network: Up	anage EUI64: 002446	б000009b905 R	ediscover Door Lock	Co	onfig	Network: Up Manage	EUI64: 00244600	000f147a o	Rediscover terfa
Device	Node ID	EUI64	Туре	Send Leave Request	Cust	Device	Node ID	EU164	Туре
Door Lock	0xb6f2	0x002446000009b905	Router	Leave Network		Combined Interface	0x0000	0x00244600000f147a	Coordinator
Combined Interface	0x0000	0x00244600000f147a	Coordinator	Leave Network		Door Lock	0xb6f2	0x002446000009b905	Router
•					•				
Endpoint 1						Endpoint 1			
Clusters and Attributes		Cluster Status				Clusters and Attributes		Cluster Commands	
Server Clusters		Identify			â	Server Clusters		Identify	
▲ Basic (0x0000)		OFF			- 11	Basic (0x0000)			-
Attribute 0x00	00 (ZclVersion) uint8	UFF			_	Identify (0x0003)		Identify 60	seconds
Attribute 0x00	01 (ApplicationVersion	Door Lock			*	b Groups (0x0004)		Identify Owner	
Attribute 0x00	07 (PowerSource) enur					Scenes (0x0005)		Identify Query	
Attribute 0x00	04 (Madalldontifior) ch	e) ch	<u></u>			> Door Lock (0x0101)		Groups	
► Identify (0x0003)	os (wodeladentiner) en	Time	· · · · · ·		\$	Time (0x000a)			
Groups (0x0004)					-	► OTA Upgrade (0x0019)		Scenes	
Scenes (0x0005)			Update Time Attr	ributes		,, <b>,</b> ,		Door Lock	
Door Lock (0x0101	1)	UTC Time						Lock/Unlock	
Client Clusters									
Time (0x000a)		- Local Time						Get Lock State:	Jnknown
OTA Upgrade (0x0     III	0019)	+ Local Time						Commands	
Value:		Write				Value:	Write	Lock Jnlock	Toggle
Devices ZCL Message ZD	0 Message					Devices ZCL Message ZDO Me	ssage		
Network Up   Channel: 11   F	PAN ID: 0xC2DE   Exten	ded PAN ID: 0xCF8A6DF218A	51696   Permit Join Time: 0	)s		Network Up   Channel: 11   PAN If	0: 0xC2DE   Extende	d PAN ID: 0xCF8A6DF218	A61696   Permit Join

#### 4.2 Sending Serial Commands to Configure a Device via USB

- 1) Open the **Door Lock** instance of RapidHA Desktop and click on **Door Lock** in the Device Table.
- 2) In the **Clusters and Attributes** window, click on the **Basic** cluster to expand it.
- 3) Click on Attribute 0x0004 (ManufacturerName). Since this attribute is a Character String Data Type, it will accept text entered in hexadecimal format, starting with a Length Descriptor. For example, "MMB\_Networks" is represented by the value 0c 4d 4d 42 5f 4e 65 74 77 6f 72 6b 73. The first byte (0c) represents a length of 12 characters, and the remaining bytes represent MMB\_Networks expressed in hexadecimal form.
- 4) The values that are written to these attributes are stored in volatile memory. Thus, they will remain as long as the RapidConnect USB Stick is not power cycled.



lagnostics Options Tools						
MMB Networks				Firmwa	are v1.2.0	COM23 👻 Clo
etwork: Up Manage	EUI64: 00244	l6000009b905	Rediscover	Device Cor	nfig: Door Lock	Con
Device	Node ID	EUI64	Туре		Send Leave Request	Custom Device Na
Door Lock	0xb230	0x0024460000091	905 Router		Leave Network	]
Combined Interface	0x0000	0x00244600000f1	47a Coordin	ator	Leave Network	]
			11			
ndpoint 1						
Clusters and Attributes		Clu	ster Status			
Server Clusters			entify			*
Basic (0x0000)			-			
Attribute 0x0000 (Z	clVersion) uint8	OF	F			
Attribute 0x0001 (A	pplicationVersio	n) uint8 Do	or Lock			\$
Attribute 0x0007 (P	owerSource) enu	.m8				
Attribute 0x0004 (N	lanufacturerNan	ne) characterU	NLOCKED			
Attribute 0x0005 (N	lodelIdentifier) c	:haracter_strir ≡				
Identify (0x0003)		Tir	ne			~
Crewne (0,0004)				Unda	te Time Δttributes	
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