



Quick Start Guide

BeeStack Consumer Home Entertainment Center Application (HECA)

Contents

About This Guide	2
Audience	2
Revision History	2
Conventions	3
Definitions, Acronyms, and Abbreviations	3
HECA Introduction	4
System Overview	4
Hardware and Software Requirements	6
HECA Installation	7
Installing on the PC	8
Running HECA	9
Running the TV Demonstration	9
Running the MP3/Audio Player Demonstration	15
Running the Home Status and Control Demonstration	18
Other Common HECA Topics	22
Switching/Cycling Between Multiple Paired Devices	22
Unpairing	22
Navigating TV Menus and Channel Guide/DVR	24
Using the Channel Guide Menu	24
Using the DVR Menu	25
1323x-RCM LEDs and Accelerometer Functionality	26
Using Home Status Control (HSC) Device Views . .	27
Home Status Control Device Properties	27
Restoring Development Boards Application Images	35

About This Guide

This guide provides an introduction to the Freescale's BeeStack Consumer Home Entertainment Center Application (HECA) Demonstration for the RF4CE (BeeStack Consumer) profile based on the MC1323x development kits. This guide describes what HECA is, how to install it, launch it, and run a simple demonstration.

For more information on ZigBee, visit www.freescale.com/802154.

One 1323x-RCM, three 1323x-REMs, and four 1323x-MRB daughter cards (one MRB plugged into every board) are required to run the HECA Demonstration.

Audience

This document is intended for Freescale BeeStack Consumer, custom software and application developers.

Revision History

Current document revision number: 1.0

The following table summarizes revisions to this document since the previous release.

Revision History

Location	Revision
Entire document	Numerous updates, added section starting on page 27.

Conventions

This document uses the following notational conventions:

- `Courier monospaced type` indicate commands, command parameters, code examples, expressions, datatypes, and directives.
- *Italic type* indicates replaceable command parameters.
- All source code examples are in C.

Definitions, Acronyms, and Abbreviations

The following list defines the abbreviations used in this document.

RF4CE	ZigBee Consumer Electronics Protocol Implemented by the BeeStack Consumer Stack
RCM	1323x-RCM board with 1323x-MRB transceiver daughter board plugged in
REM	1323x-REM board with 1323x-MRB transceiver daughter board plugged in
HECA	Home Entertainment Center Application
NSK	Network Starter Kit
ZRC	ZigBee Remote Control Application Profile
GUI	Graphical User Interface
LED	Light Emitting Diode
MCU	MicroController Unit
PC	Personal Computer
PBP	Push Button Pairing Mechanism in the ZRC Profile
USB	Universal Serial Bus

HECA Introduction

This guide shows how to install the Freescale BeeStack Consumer Home Entertainment Center Application, how to use the 1323x-RCM to control the HECA TV, MP3 Player and Home Status and Control views using 1323x-REMs as gateway nodes for the RF4CE (BeeStack Consumer) connection, and how to program or reprogram the boards using the embedded image files.

System Overview

The Home Entertainment Center Application (HECA) demonstration is a set of software components designed to demonstrate how a BeeStack Consumer remote control can be used to control Consumer Electronics devices. The PC HECA comprises three different Graphical User Interface (GUI) views that simulate the following real world appliances:

- TV
- MP3/Audio Player
- Home Status and Control Panel for Home Automation device monitoring

Three 1323x-REM boards are required to demonstrate full Home Status and Control capability. However, only one 1323x-REM board is required to run either the TV or MP3/Audio application. Each board as provided in the Freescale Development Kit must be attached to the PC running the GUI application to act as the gateway BeeStack Consumer network nodes for the GUI views.

The single 1323x-RCM board can be battery powered and will use the BeeStack Consumer ZRC push button pairing (PBP) mechanism to establish a wireless connection between the 1323x-RCM and each of the 1323x-REMs. Once the connection is established, the gateway 1323x-REMs will forward remote control messages from the 1323x-RCM to each corresponding GUI consumer electronics device view, as well as status messages from the GUI views to the 1323x-RCM which can then use peripherals such as the LCD or buzzer to show messages to users. This demonstrates bidirectional communication between the 1323x-RCM and the consumer electronics devices.

Figure 1 shows the HECA PC and board setup.

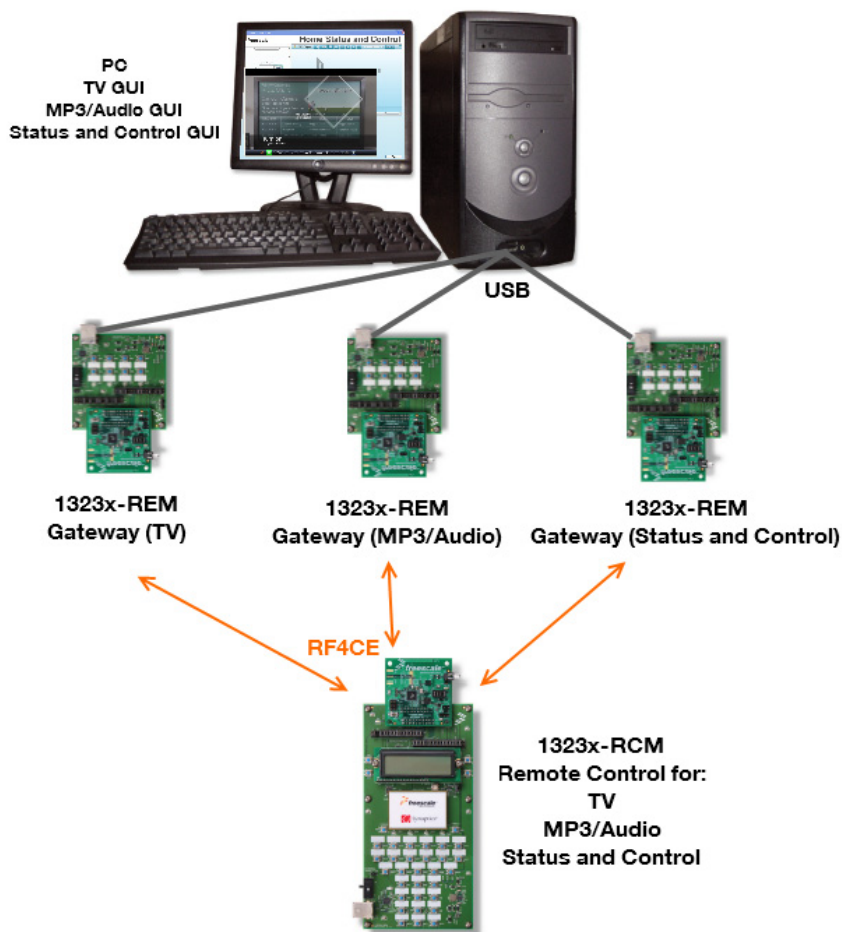


Figure 1. HECA System Overview (Full Setup)

Hardware and Software Requirements

The following is a list of the minimum software and hardware requirements required by HECA as shown in this guide:

- A PC running Microsoft Windows XP[®], Microsoft Windows Vista[®], or Microsoft Windows 7[®]
- Microsoft .NET Framework version 3.5 SP1 and Windows Media Player 9 or later is required to run the Home Entertainment Center Application PC GUI views
- BeeKit for the MC1323x with Home Entertainment Center Application and Serial USB MC1323x FTDI drivers installed
- One 1323x-RCM board
- Three 1323x-REM boards provided in the Freescale MC1323x Network Development Kits. If using only a subset of the three HECA GUI Consumer Electronics device views, for example, for a TV view only, use the appropriate number of 1323x-REM boards (one for each view)
- Four 1323x-MRB daughter boards to plug into each of the 1323x-RCM and 1323x-REMs
- One USB cable for each 1323x-REM that is connected to the PC running the HECA GUI
- Two AA batteries if users choose to power the 1323x-RCM board by battery power
- The Test Tool application from the BeeKit package may be used if users need to reprogram the embedded images on the development boards but it is not required to run the demonstration

HECA Installation

HECA software consists of the following two components:

- Embedded software running on the physical MC1323x evaluation boards:
 - The 1323x-RCM board runs the BeeStack Consumer ZRC application that simulates a remote control device.
 - Each of the 1323x-REM boards runs an identical BeeStack Consumer gateway application which is based on the BlackBox application template from the BeeKit BeeStack Consumer codebase. The PC views communicate with this application via the USB/UART and use it to pair and unpair as well as allow for wireless communications between the simulated GUI Consumer Electronics devices running in the PC views and the 1323x-RCM ZRC application.
- HECA Windows GUI software running on a PC that allows users to run up to three simulated Consumer Electronics devices and view each of those as their status changes when being controlled by the application running on the 1323x-RCM.

When installing Freescale BeeKit with HECA, both software components are deployed to the system. The HECA embedded software consists of embedded image files used to program the boards. The embedded image files are located in the HECA installation folder on the PC. The Freescale MC1323x-NSK development kits also come with the HECA embedded images pre-programmed on the boards.

Installing on the PC

HECA is installed by default with the BeeKit Wireless Connectivity Toolkit software supporting the MC1323x development kits. To install HECA, make sure that while installing BeeKit, the Home Entertainment Center Application (HECA) component check box is selected as shown in Figure 2.

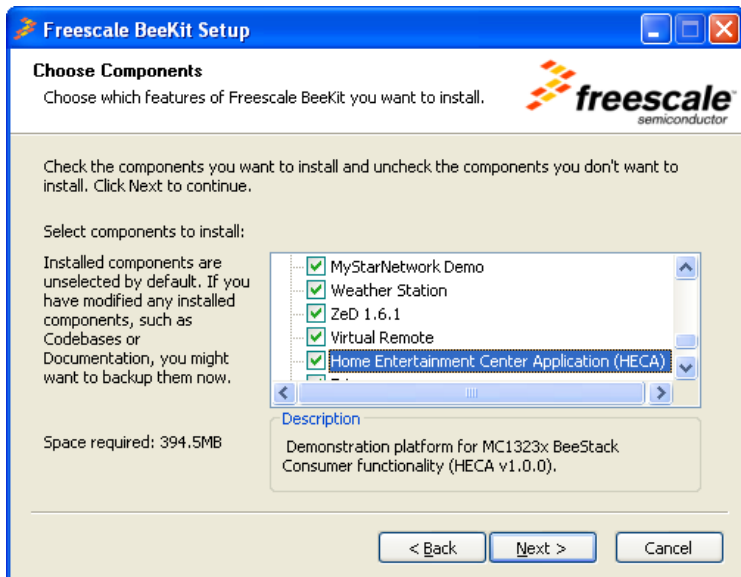


Figure 2. Selecting HECA to be Installed From the BeeKit Installer

Refer to the *BeeKit Wireless Connectivity Toolkit Quick Start Guide* for details on how to use the BeeKit installer.

By default, the installation program copies the HECA software (including a folder for the embedded image files) to the PC hard drive in the following folder location:

Program Files\Freescale\HECA

The installation program also creates a shortcut to the HECA PC GUI application in the following location:

Start -> Programs -> Freescale BeeKit -> Home Entertainment Center
-> Home Entertainment Center Application (HECA)

Running HECA

This section provides the steps required to start the Home Entertainment Center Application and its simulated Consumer Electronics device views on the PC, use the Freescale pre-programmed MC1323x NSK kit with the 1323x-RCM and 1323-REM and 1323x-MRB development boards to establish RF4CE (BeeStack Consumer) connections, and demonstrate basic Remote control functionality between the 1323x-RCM and the GUI views through the 1323x-REMs.

Running the TV Demonstration

Start the HECA PC Application by performing the following tasks.

1. Click on the link from the Windows Start Menu at:

Start -> Programs -> Freescale BeeKit -> Home Entertainment Center
-> Home Entertainment Center Application (HECA)

or by using the application shortcut on the Windows desktop.

2. At startup, HECA displays a toolbar style UI from which each one of the three simulated Consumer Electronics devices can be launched as shown in [Figure 3](#).

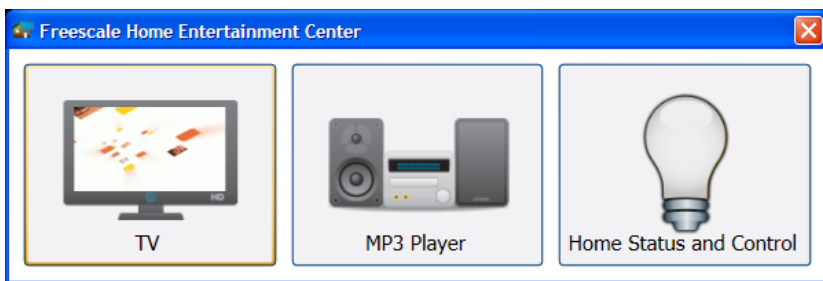


Figure 3. HECA Start View Toolbar

3. Connect one of the pre-programmed development kit 1323x-REM boards to the PC using a USB cable.
4. Power on that 1323x-REM board using the On/Off Switch. If this is the first time the board has been connected to the PC, follow the installation instructions in the “Found New Hardware” wizard. Choose the following folder as the location of the drivers if requested:

Program Files/Freescale/Drivers folder

5. From the HECA toolbar view click the TV option. Wait until the TV Device view appears as shown in [Figure 4](#).

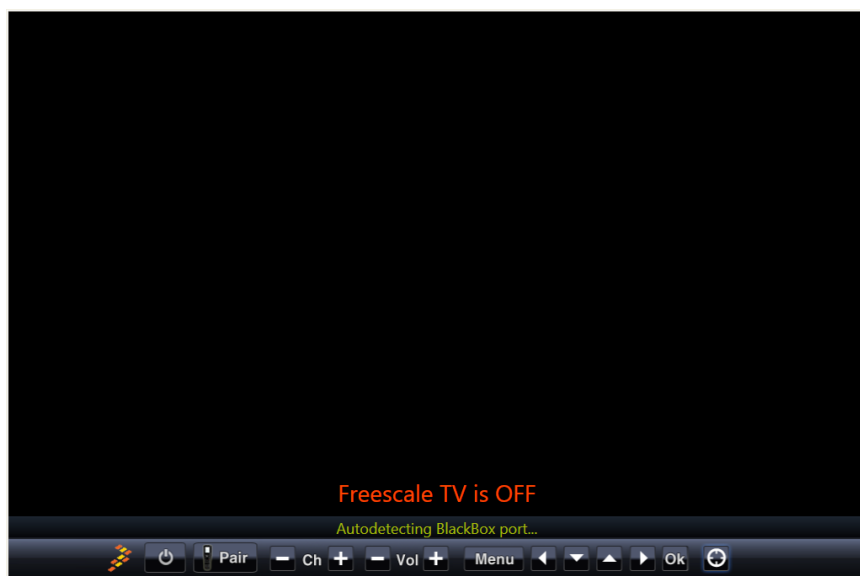


Figure 4. HECA TV Initial GUI View

7. At startup, the TV view auto detects the PC serial port on which a 1323x-REM BlackBox/Gateway application is running. Wait until the auto detection process is complete and the BlackBox node is started as indicated by the status message “Local Node Started.

8. Install 2 AA batteries on the back of the 1323x-RCM board as shown in [Figure 5](#).



Figure 5. 1323x-RCM Board Back with Batteries Installed

9. Power on the 1323x-RCM board using the On/Off switch.
10. Press the reset switch on the MRB daughter board plugged into the 1323x-RCM. This initializes the LCD display. The “No device” text is displayed ([Figure 6](#)) on the LCD to indicate that the remote is not yet paired with any other BeeStack Consumer device.



Figure 6. 1323x-RCM Initialized Board

11. The mapping between 1323x-RCM board buttons and remote control functionality is shown by the labels in [Figure 7](#).

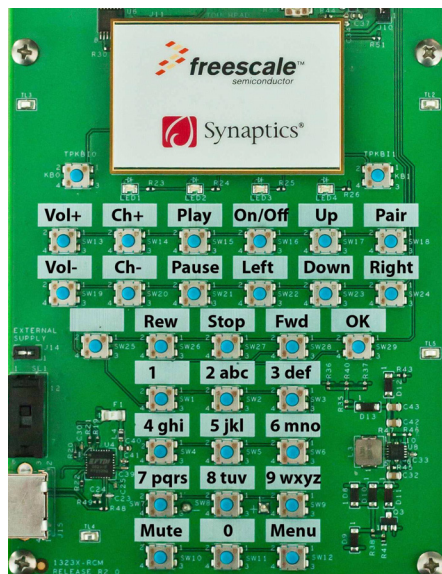


Figure 7. 1323x-RCM Function Button Mapping

13. Initiate the RF4CE ZRC Push Button Pairing (PBP) on the 1323x-RCM by pressing and holding the SW18 (“Pair”) on the 1323x-RCM until the “Searching Device” message appears on the LCD. The LCD display shows a progress bar ([Figure 8](#)) while searching for a device to respond to the pairing

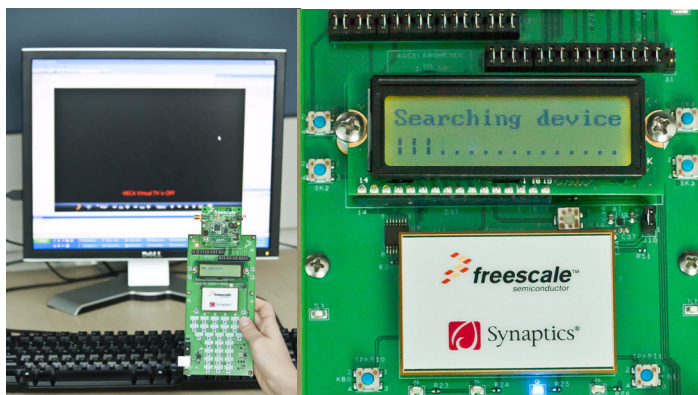


Figure 8. Initiating Push Button Pairing on 1323x-RCM

14. Within 30 seconds from initiating PBP on the 1323x-RCM, start the pairing process on the HECA TV GUI by moving the PC mouse over the TV window and clicking the “Pair” button in the button bar when it appears at the bottom of the TV window (Figure 9).

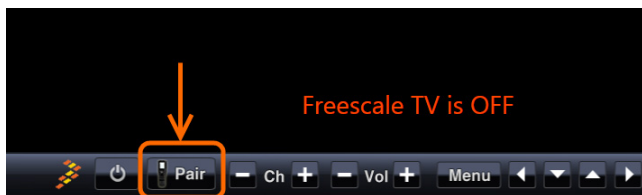


Figure 9. Pair Button Highlighted in TV GUI

16. When the pairing is established, both the LCD on the 1323x-RCM and the TV GUI will show corresponding status messages. The 1323x-RCM LCD displays the current status of the TV: “FSL TV is off” and the GUI shows the message “Pairing success” as shown in Figure 10,

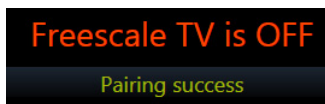


Figure 10. Pairing Success Status

17. The 1323x-RCM is now ready to control the TV GUI. Press SW16 (Power Toggle On/Off) on the board to turn the simulated TV on. The TV starts on channel FSL 1 as shown in Figure 11 and runs a sample video file playback to simulate a TV broadcast.

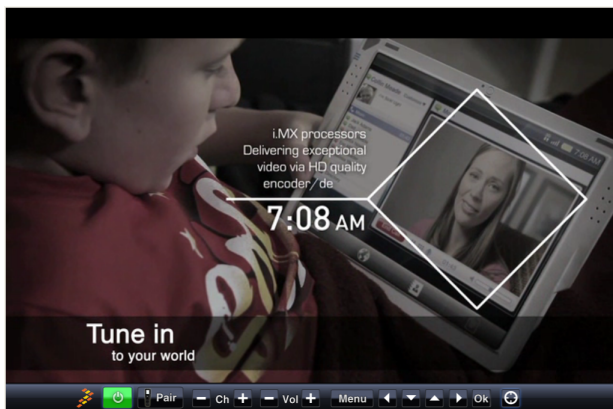


Figure 11. TV GUI Showing Video File

18. Use SW13 (Vol+) and SW20 (Vol-) on the 1323x-RCM to increase or decrease the audio volume of the video file playback. Notice the volume changes on the status being displayed on both the PC GUI and the 1323x-RCM LCD. Alternatively, use up or down touch swipe gestures on the 1323x-RCM touchpad to perform the same volume change functionality as shown in [Figure 12](#).



Figure 12. Changing Volume Using Touchpad Gestures

19. Use SW14 (Ch+) and SW19 (Ch-) on the 1323x-RCM to change channels up and down. Notice how the channel changes appear in the GUI as well as the status messages updated on the 1323x-RCM LCD to indicate the current channel. Alternatively, use right or left touch swipe gestures on the 1323x-RCM touchpad to perform the same channel change functionality.

20. In the TV GUI, press the “Find Remote” button highlighted in [Figure 13](#). Notice how the buzzer on the 1323x-RCM makes a sound. This helps simulate the scenario where a Remote Control device may be misplaced and the bidirectional RF communication is used to help users find its location more quickly.

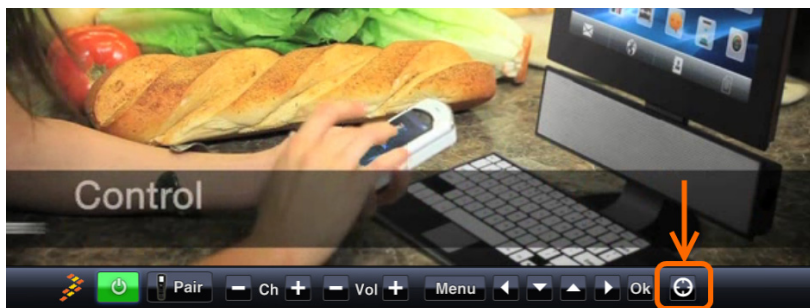


Figure 13. Exercising the “Find Remote” feature

Running the MP3/Audio Player Demonstration

Running the MP3/Audio Player Demonstration scenario assumes the user has already performed the steps in the [Running the TV Demonstration](#) section and has not closed the application windows. If starting directly with the MP3/Audio Player scenario, perform Step 1 of the TV scenario to start the HECA toolbar view and Steps 7 through 9 to start the 1323x-RCM.

In all cases, continue with the following steps to run the MP3/Audio Player demonstration:

1. Connect another one of the pre-programmed NSK development kit 1323x-REM boards to the PC using a USB cable.
2. Power on the 1323x-REM board using the On/Off Switch. If this is the first time the board has been connected to the PC, follow the installation instructions in the “Found New Hardware” wizard. Choose the following folder as the location of the drivers if requested:

Program Files\Freescale/Drivers folder

3. From the HECA toolbar view click the MP3 Player option. Wait until the MP3 Player view appears as shown in [Figure 14](#).

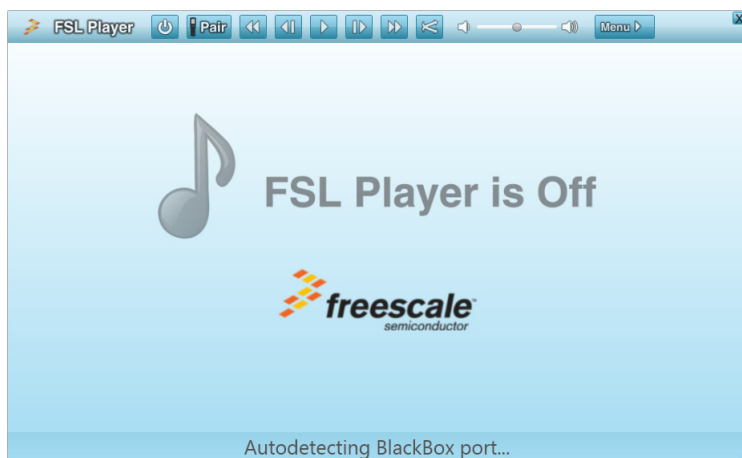


Figure 14. HECA Audio Player GUI View

4. At startup, the player view auto detects the PC serial port on which a 1323x-REM BlackBox/Gateway application is running. Wait until the auto detection process is complete and the BlackBox node is started as indicated by the status message “Local Node Started.
5. Initiate the RF4CE ZRC Push Button Pairing (PBP) on the 1323x-RCM by holding the SW18 (“Pair”) on the 1323x-RCM until the “Searching Device” message appears on the LCD. The LCD shows a progress bar while searching for a device to respond to the pairing as shown in [Figure 8](#).
6. Within 30 seconds from initiating PBP on the 1323x-RCM, start the pairing process in the MP3/Audio Player view by clicking the “Pair” button in the button bar shown at the top of the MP3/Audio Player GUI. The button is highlighted in [Figure 15](#).



Figure 15. Pairing with the Remote in the Audio Player

8. When the pairing is established, both the 1323x-RCM LCD and the MP3/Audio Player GUI shows corresponding status messages as shown in [Figure 14](#). The LCD displays the current status of the TV: “FSL MP3 is off” and the GUI shows the message: “Pairing success”.
9. The 1323x-RCM is now ready to control the MP3/Audio Player view. Press SW16 (Power Toggle On/Off) on the 1323x-RCM to turn the player on. The application starts playing the first track in its play list as shown in [Figure 16](#).



Figure 16. Playing a Track in the Audio Player

11. Use SW13 (Vol+) and SW19 (Vol-) on the 1323x-RCM to increase or decrease the volume of the playback. Alternatively, perform up or down touch gestures on the 1323x-RCM touchpad to perform the same functionality.
12. Use SW14 (Ch+) and SW20 (Ch-) on the 1323x-RCM to change between tracks in the audio play list. Notice how the track names change in the GUI as well and in the status messages on the 1323x-RCM LCD. Alternatively, perform left or right touch gestures on the 1323-RCM touchpad to change between tracks.
13. To add other MP3 files to the MP3/Audio Player application files, drag and drop the files to the MP3/Audio Player application window. If the MP3 files have a embedded album art image tags, the image will also appear in the MP3/Audio Player GUI.

14. Click on Menu in the MP3/Audio Player toolbar or press SW12 on the 1323x-RCM to display an application menu in the MP3/Audio Player GUI that displays current play lists and tracks in the library as shown in [Figure 17](#). From the 1323x-RCM, use buttons SW17, SW22, SW23, SW24, and SW29 to perform the menu navigation actions of Up, Left, Down, Right and OK/Confirm respectively. Click on Menu or press SW12 again to toggle the play list menu off.

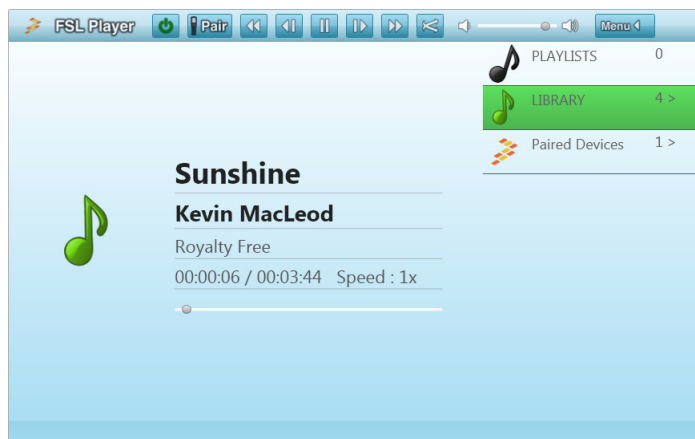


Figure 17. Audio Player Showing Library Menu

Running the Home Status and Control Demonstration

The Home Status and Control (HSC) HECA view allows users to navigate a Home Automation control panel view using the same 1323x-RCM used for the TV and the MP3/Audio Player devices. The simulated devices to be controlled using the HSC view are:

- On/Off light
- Dimmable Light
- Fan
- Thermostat

Running the HSC Demonstration scenario assumes that users have already performed the steps in the [Running the TV Demonstration](#) and [Running the MP3/Audio Player Demonstration](#) sections and has not closed the application windows. If starting directly with the HSC

scenario, perform Step 1 of the TV scenario to start the HECA toolbar view and Steps 7 through 9 to start the 1323x-RCM.

In all cases, continue with the following steps to run the HSC demonstration.

1. Connect the third of the pre-programmed NSK development kit 1323x-REMs to the PC using a USB cable.
2. Power on the 1323x-REM using the On/Off Switch. If this is the first time the board has been connected to the PC, follow the installation instructions in the “Found New Hardware” wizard. Choose the following folder as the location of the drivers if requested:

Program Files\Freescale/Drivers folder

3. From the HECA toolbar view, click the Home Status and Control option. Wait until the HSC Panel view appears as shown in [Figure 18](#).

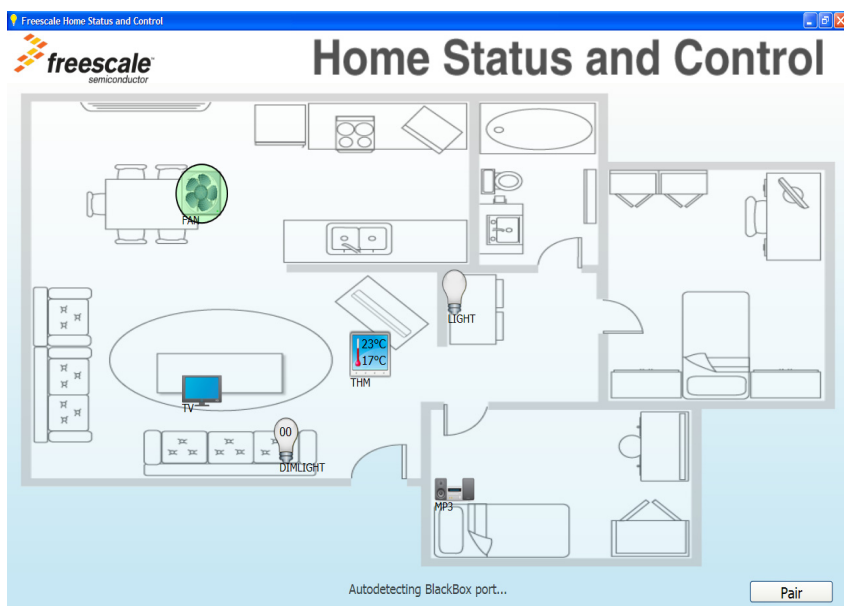


Figure 18. HECA HSC GUI View

5. At startup, the player view auto detects the PC serial port on which the 1323x-REM BlackBox/Gateway application is running. Wait until the auto detection process is complete and the BlackBox node is started as indicated by the status message “Local Node Started.

6. Initiate the RF4CE ZRC Push Button Pairing (PBP) on the 1323x-RCM by holding the SW18 (“Pair”) on the 1323x-RCM until the “Searching Device” message appears on the LCD. The LCD shows a progress bar while searching for a device to respond to the pairing as shown in [Figure 8](#).

7. Within 30 seconds from initiating PBP on the 1323x-RCM, start the pairing process in the HSC view by clicking the “Pair” button shown at the bottom right of the application window ([Figure 18](#)).

When the pairing is established, both the LCD and the HSC GUI show corresponding status messages. The GUI shows the One Paired Device label above the “Pair” button. The LCD displays the current status of the highlighted device in the HSC view: “FAN is on” and “Fan intensity”.

8. The 1323x-RCM is now ready to control the HSC view. Perform left and right touch swipe gestures on the 1323x-RCM touchpad to switch/cycle the device selection/highlighting in the HSC GUI. Each time a device is selected, the LCD on the 1323x-RCM shows the specific device status.

9. The 1323x-RCM functions such as Power On/Off or Vol+/Vol- only affect only the selected device.

10.If the On/Off Light is selected, use the following 1323x-RCM functions to change the device status:

- SW16 (Power On/Off Toggle) toggles the light on or off
- Short tap on the touchpad opens the On/Off Light properties window

11.If the Dimmable Light is selected, use the following 1323x-RCM functions to change the device status:

- SW16 (Power On/Off Toggle) toggles the light on or off (dimming level 0 to 100%)
- SW13 (Vol+) and SW19 (Vol-) increases and decreases the dimmable light intensity in 10% increments
- Short tap on the touchpad opens the Dimmable Light properties window

12.If the Thermostat is selected, use the following 1323x-RCM functions to change the device status:

- SW16 (Power On/Off Toggle) toggles the Fan device which is connected to the thermostat on or off

- SW13 (Vol+) and SW19 (Vol-) increases and decreases the desired temperature of the Thermostat. Note that when the desired temperature value gets closer to the measured temperature, the fan intensity slows down

- Short tap on the touchpad opens the Thermostat properties window

13.If the Fan is selected, use the following 1323x-RCM functions to change the device status:

- SW16 (Power On/Off Toggle) toggles the Fan on or off

- SW13 (Vol+) and SW19 (Vol-) increases and decreases the fan intensity independently from the Thermostat

- Short tap on the touchpad opens the Fan properties window

14.For all devices, the properties window allows users to access the device configuration/status window. Notice that the 1323x-RCM Touchpad now works in “Mouse mode” where it can control the Windows mouse cursor similar to a notebook touchpad.

15.If the TV or MP3/Audio Player devices are selected in HSC, short tapping on the touchpad or using SW16 (Power On/Off Toggle) can activate the HECA TV and MP3/Audio Player views respectively.

Other Common HECA Topics

Switching/Cycling Between Multiple Paired Devices

If the 1323x-RCM has been paired with more than one HECA device view (TV, Audio Player, or HSC) switch/cycle between the devices to be controlled by short pressing SW18 (the “Pair” button) on the 1323x-RCM. This also moves the currently controlled device window to the top of the GUI.

Cancelling a Pairing

To cancel the pairing between the 1323x-RCM and the GUI views can depend on the interface being used.

To cancel a pairing from a device using the 1323x-RCM, use the following steps:

1. Select the device as active/controllable on the 1323x-RCM by cycling between devices as already stated using a short press on SW18.
2. Double-press SW18 to initiate unpairing. Confirm the unpairing by pressing SW18 again when the unpair prompt is displayed on the LCD.

To cancel a pairing from a device using the PC TV GUI, perform the following steps:

1. With the TV turned On, click Menu from the TV button bar (or use SW12 and the directional and OK keys when the 1323x-RCM is controlling the TV.)
2. In the GUI Menu, navigate to the Settings entry or double click the entry with the mouse to select the following:
 - Select the Paired Devices entry
 - Select UnPair for the remote to be unpaired as shown in [Figure 19](#).

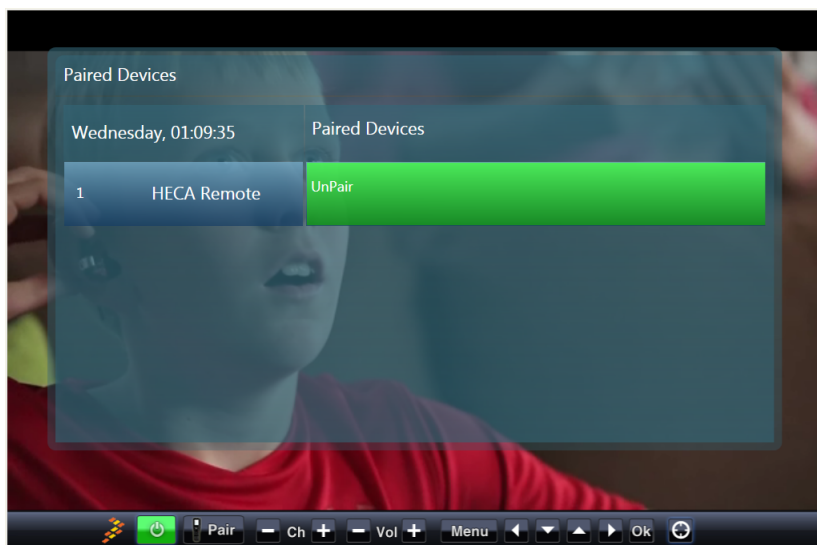


Figure 19. Cancelling A Pairing the Remote from the TV GUI

To cancel a pairing from a device using the MP3/Audio Player GUI, perform the following steps:

1. Choose Menu from the MP3/Audio Player button bar (or use SW12 and the directional keys when the 1323x-RCM is controlling the Audio Player.)
2. In the Menu, navigate to the Paired Devices item and enter the submenu and choose the following:
 - In the Paired Devices submenu select the remote to be unpaired
 - Select Unpair and Confirm

To cancel a pairing from a device using the HSC GUI, perform the following steps:

1. Click the Paired Devices label in the bottom right corner of the view window.
2. In the displayed property window, click the “Unpair” button corresponding to the remote that needs to be unpaired.

Navigating TV Menus and Channel Guide/DVR

When the TV view is active, access a TV Menu, Channel Guide with DVR simulation, and an Internet TV view. Use SW12 on the 1323x-RCM to toggle the TV menu on and off as shown in [Figure 20](#). Use buttons SW17, SW22, SW23, SW24, and SW29 to perform the menu navigation actions of Up, Left, Down, Right and OK/Confirm respectively.

Using the Channel Guide Menu

The Channel Guide menu view appears as shown in [Figure 20](#):

- Use the 1323x-RCM navigational keys or touchpad directional gestures to navigate the TV show schedules.
- When a show is selected, press the 1323x-RCM OK key or single tap on the touchpad to add that show to the DVR recordings list.
- In the confirmation message, navigate between the two options using the navigational keys or directional touchpad gestures.

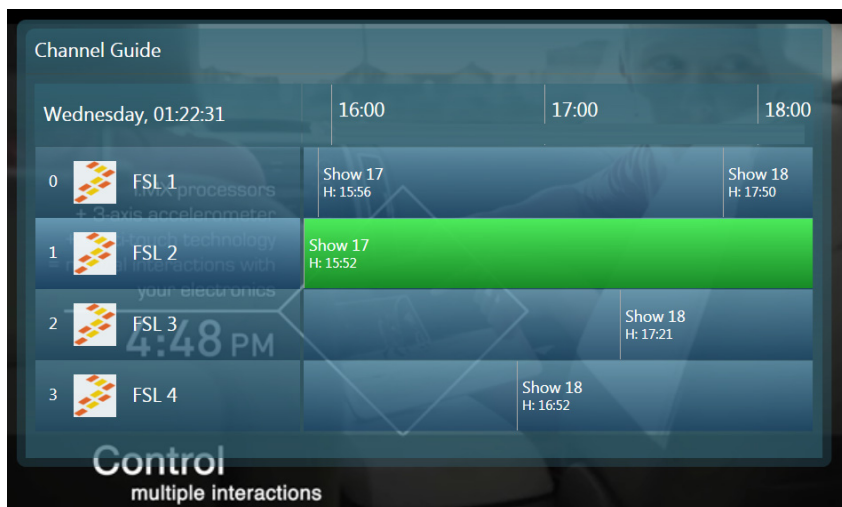


Figure 20. Channel Guide Navigation

Using the DVR Menu

In the Recordings/DVR view, navigate a recording list added from the channel guide.

- In the Web Browser/Internet TV, use the repeated number keys to enter a URL in the same way as writing a text message on a mobile phone (use the 1 key for the dot sign). Choose the OK key to access the URL as shown in [Figure 21](#).

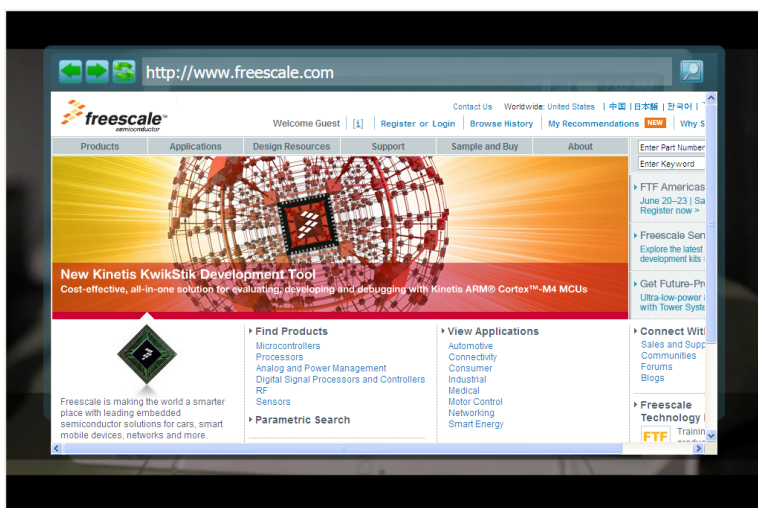


Figure 21. Web Browser/Internet TV view

- In the TV Settings view, Unpair, Pair to a new device, toggle between using the touchpad in gesture mode or mouse mode, and toggle the full screen setting.

1323x-RCM LEDs and Accelerometer Functionality

Other 1323x-RCM peripherals used in the HECA demonstration are the board LEDs and accelerometer sensor and they are used as follows:

- The 4 LEDs display a progress/standby indication by turning on and off in quick succession while the Push Button Pair process with another device is pending on the remote.
- Placing and holding one finger on the touchpad activates accelerometer gestures. This is indicated when LED 1 is turned on, on the 1323x-RCM. When accelerometer gestures are activated, turn the 1323x-RCM 90 degrees left or right around its length axis to perform HECA functionality. For instance, the left and right accelerometer gestures in the TV GUI turn the volume down or up respectively.
- When LED 2 is turned on, it indicates that the 1323x-RCM touchpad is in “mouse mode” and sending a continuous coordinate stream to the HECA views instead of just directional gesture data.
- When LED 4 is turned on, it indicates a transmission of an RF command from the remote. It is turned off when the transmission is complete.

Using Home Status Control (HSC) Device Views

Home Status Control Device Properties

This section describes the different devices that appear in the HSC view and how to control them. When a device is selected in the HSC view, a selection box appears around the device icon and the device is controlled using either the 1323x-RCM or the GUI as described in this section.

Fan Control

The Fan can be controlled from the 1323x-RCM using volume up (SW13) and channel up (SW14) to increase the fan speed and volume down (SW19) and channel down (SW20) to decrease the fan speed. To stop or start the fan, the remote On/Off button can also be used. Fan up and fan down commands can be simulated using accelerometer actions as follows:

- Keep one finger on the touch pad and swing the remote left for fan down.
- Keep one finger on the touch pad and swing the remote right for fan up.

Fan Properties

The fan property box as shown in [Figure 22](#), allows users to set the fan to full speed by pressing the On button and stop the fan by pressing the Off button. When the property window is open, the 1323x-RCM touch pad enters “mouse mode” and the mouse pointer can be controlled from the 1323x-RCM touch pad.

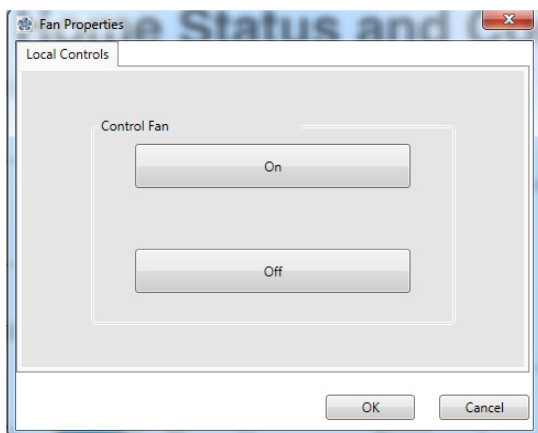


Figure 22. HSC Fan Properties

Light Control

To control the light, use the On/Off button (SW 16) on the 1323x-RCM to turn the light off and on.

Light Properties

From the Local Controls property tab shown in [Figure 23](#), turn on the light by pressing the On button, and turn it off by pressing the Off button. The light state can be toggled by pressing the Toggle button. When the property window is open, the touch pad enters “mouse mode” where the mouse pointer can be controlled from the 1323x-RCM touch pad.

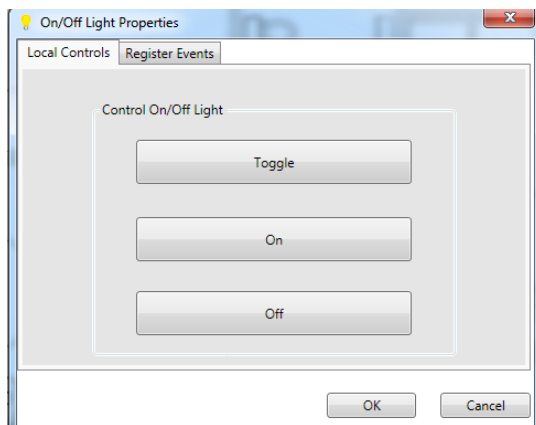


Figure 23. Light Property Tab Local Control

In the Light Properties Register Events tab shown in [Figure 24](#), choose to receive light state information displayed on the 1323x-RCM LCD by selecting the Receive light on/off indication on remote option. Force the application to start generating new light states every 20 seconds by selecting that corresponding option. Every new state generated is displayed as a message on the 1323x-RCM LCD.

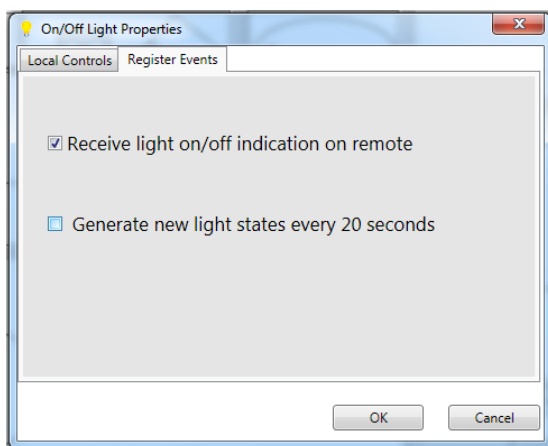


Figure 24. Light Property Register Events

Dimmable Light Control

The Dimmable light can be controlled from the 1323x-RCM using the volume up (SW13) and channel up (SW14) to increase the light intensity and volume down (SW19) and channel down (SW20) to decrease the light intensity. To stop or start the dimmable light, use the On/Off button (SW16). Intensity up and down commands can be simulated using the accelerometer as follows:

- Keep one finger on the touch pad and swing the remote left for intensity down.
- Keep one finger on the touch pad and swing the remote right for intensity up.

Dimmable Light Properties

From the Dimmer Light Local Controls properties window shown in [Figure 25](#), set the dimmable light intensity using the slider bar. Move the

bar with the mouse or use the Level up and Level down buttons which move the slide bar up or down 10 steps.

In the On/Off group, set the intensity to 100% by pressing the On button, or set the intensity to 0% by pressing the Off button. Toggle between these states by pressing the Toggle Button.

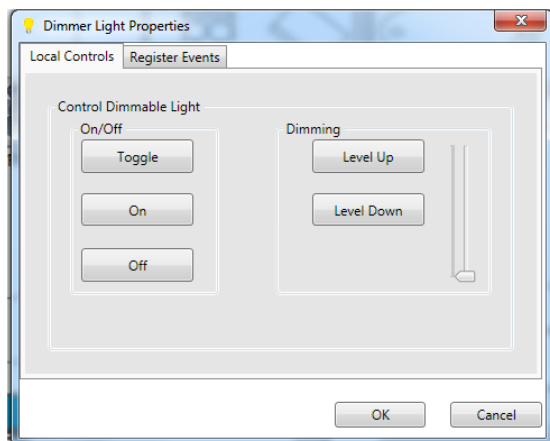


Figure 25. Local Control Properties for Dimmable Light

When the property window is open, the touch pad enters “mouse mode” where the mouse can be controlled from the 1323x-RCM touch pad.

In the Dimmer Light Register Events tab as shown in [Figure 26](#), choose to receive dimmable light state information messages on the 1323x-RCM LCD by selecting the Receive light percentage indication option. Force the application to start generating new dimmable light states every 20 seconds by selecting the Generate new light values every 20 seconds option. Every new state generated is displayed as a message on the 1323x-RCM LCD.

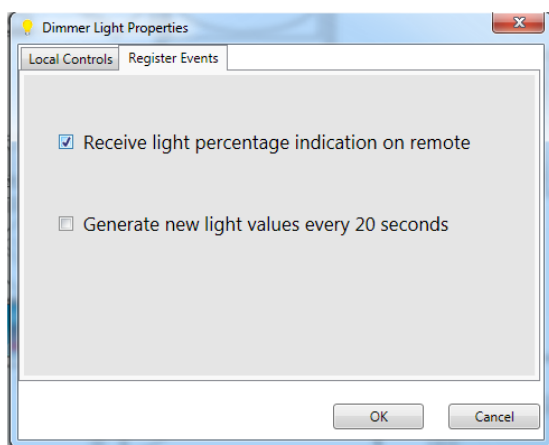


Figure 26. Register Event Tab on Dimmable Light

Thermostat Control

Control the Thermostat device from the 1323x-RCM by pressing the On/Off button which starts or stops the thermostat. Use the volume up (SW13) and channel up (SW14) buttons to increase the temperature selection and volume down (SW19) and channel down (SW20) to decrease the temperature selection. Setting the temperature also controls the Fan speed. Temperature up and down commands can be simulated using the accelerometer as follows:

- Keep one finger on the touch pad and swing the remote left for level down.
- Keep one finger on the touch pad and swing the remote right for level up.

Thermostat Properties

When the Thermostat Properties window is open, the touch pad enters “mouse mode” and the mouse is controlled from the 1323x-RCM touch pad.

From the Local Controls tab as shown in [Figure 27](#), set the threshold temperature using the scroll bar or use the Level Up and Level Down buttons. Use the On button to start the thermostat and the Off button to stop the thermostat.

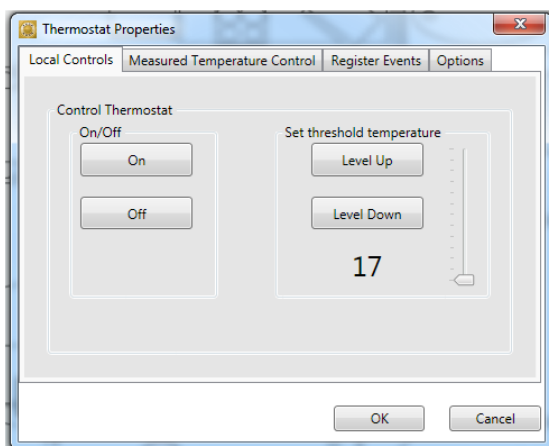


Figure 27. Thermostat Properties Tab Local Controls

Use the Measured Temperature Control Tab as shown in [Figure 28](#) to simulate a change in the measured temperature inside the house by pressing the Level Up and Level Down buttons in the Set measured temperature group. Selecting the Randomly generated events group makes the thermostat generate a new measured temperature every 20 seconds. The new measured temperature will be appear as a message on the 1323x-RCM LCD.

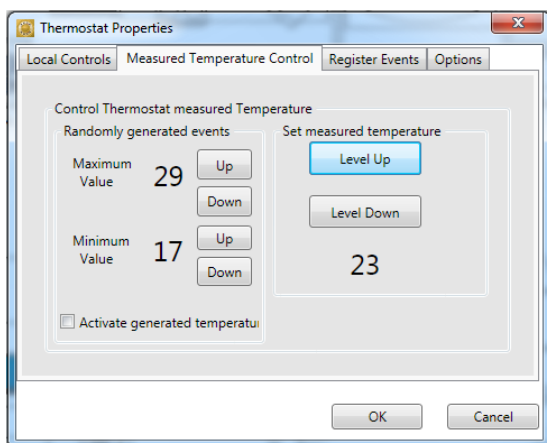


Figure 28. Thermostat Properties Tab Measured Temperature Control

Activate this option by choosing the Activate generated temperature check box and set an interval for the randomly generated temperature.

Use the Thermostat property tab as shown in [Figure 29](#) to receive an indication on the 1323x-RCM LCD when the measured temperature or threshold temperature changes in the application.

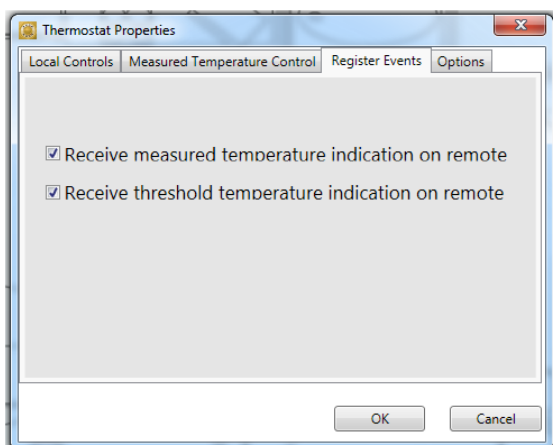


Figure 29. Thermostat Properties Tab Register Event

Use the Thermostat properties tab options as shown in [Figure 30](#) to select either the Fahrenheit or Celsius temperature scale.

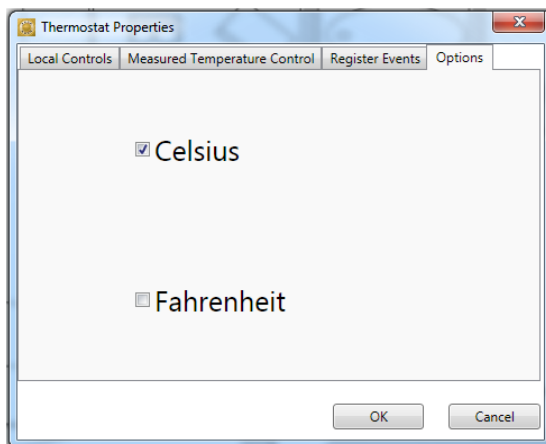


Figure 30. Thermostat Properties Tab Options

TV and MP3

When the selection is set to the TV and MP3 icon, users can start or switch to the HECA TV and MP3 view. The 1323x-RCM LCD displays which view is active.

If the location for the TV or MP3 icon application has changed, the new location is set from the HSC paired device properties window.

Restoring Development Board Application Images

In the event that the HECA application images on the boards are overwritten with other development software, they can be restored using the precompiled *.s19 files available in the HECA/Images folder or restored with potential custom options using the templates provided in the BeeKit HCS08 BeeStack Consumer codebase 1.6.0 or later.

Use Test Tool 12 to reprogram the binary *.s19 images. To reload the s19 files using Test Tool 12, perform the following steps:

1. Connect a P&E BDM Multilink to the board.
2. From the tool bar, choose Firmware Loaders -> HCS08 Firmware Loader.
3. In the Firmware Loader GUI choose Browse... and navigate to:
`Program Files\Freescale\HECA/Images`
4. Choose an *.s19 file corresponding to the board to be programmed (1323-REM or 1323x-RCM).
5. Click Upload to start board programming.

Alternatively, use the BeeStack Consumer codebase and the ZTC Node App template (with the Enable BlackBox feature selected) for the gateway 1323x-REM nodes and the MC1323x Remote Emulator Node App template for the 1323x-RCM as starting points for HECA enabled applications.



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